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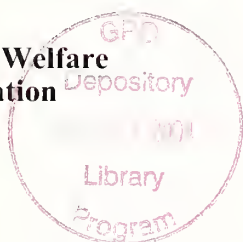
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Information Resources on the Care and Welfare of **Beef Cattle**

June 2004



AWIC Resource Series No. 24



Information Resources
on the
Care and Welfare of
Beef Cattle

June 2004

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Watering cattle and providing shelter are two important ways to help keep them cooler and less stressed during heat waves.

by Keith Weller

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How to Use This Document

This publication is divided into three major sections: Introduction, Bibliography, and Website Resources. A section containing National Agricultural Library Document Delivery Information for U.S. and foreign patrons and a subject Index follows these sections.

Introduction

The introduction to this document was written jointly by James Oltjen, Ph.D, and Frank Mitloehner, Ph.D., Extension Specialists with Department of Animal Science, University of California. They have reviewed and summarized the latest research and regarding the care and welfare of today's beef cattle and provided comments on critical areas of concern.

Bibliography

An extensive bibliography categorized into eleven subject subsections covering all aspects of beef cattle care, husbandry, health, and welfare comprise this section of the publication. Citations were selected from searches conducted using a variety of agricultural, medical, and life science databases. Within a subject category citations are arranged alphabetically according to the last name of the primary author. Each citation is listed with a set of keywords that describe useful information about the entry. If a citation is listed from a publication available through the National Agricultural Library (NAL) a NAL call number has been included. Entries were included with publications dates ranging from 1996-2003. **Please note that citations with a copyright notice are protected by U.S. and/or international copyright laws and are used by special permission.**

Web Site Resources

More than forty annotated web site resources relating to the care, welfare, and housing of beef cattle have been selected and listed alphabetically for convenience. Resources selected cover: codes of practice, animal welfare requirements, housing, disease, nutrition, and general

husbandry information. World Wide Web addresses are listed to access specialized databases, extension materials, and publications produced by a variety of non-profit organizations. All resources are accessible through the internet and are current as of October 2003. Readers are cautioned as to the dynamic nature of the internet and the fact that addresses and content are subject to change.

National Agricultural Library Document Delivery

This section provides information on how to request materials that are included in the collection of the National Agricultural Library (NAL). Please read carefully as there are certain restrictions on media and document types.

All patrons are encouraged to explore local library resources first before contacting the National Agricultural Library.

Index

The index for this publication was generated from keywords assigned to each entry. The number associated with each index term corresponds to the *page number* on which the index term can be found.

An Overview of Current Beef Welfare Concerns

James W. Oltjen, Ph.D, and Frank M. Mitloehner, Ph.D.

Animal Management Systems and Air Quality Extension Specialists, Department of
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Although beef cattle welfare issues have not attracted as much concern as for those for other farm animals, it does not mean that they are not important, both to those who have a direct association with the beef industry as well as to those looking in from the outside. Progress has been made in understanding beef welfare since the last Housing, Husbandry, and Welfare of Beef Cattle publication (AWIC, 1995), and the new bibliography presents an expanding database. This introduction is to share our views on current beef welfare issues as they affect beef cattle raised in the United States, and we direct readers to the bibliography following for more in-depth information on the welfare issues.

Knowledgeable beef producers are concerned about the welfare of their animals. They know that cattle treated correctly will perform well. If even a small proportion of beef producers provide less than optimum care, it is a concern to other beef producers and all others associated with beef production. Therefore it is in everyone's best interest that animals receive proper care throughout the production cycle.

One of the main animal welfare concerns in beef cattle production is that of pain and distress, especially pain inflicted by normal husbandry procedures other than common day to day stress in typical production. There is little concern, for example, about cows on rangelands, as long as nutrition is not severely restricted. Rather, dehorning, castration, and branding are husbandry procedures which can cause pain and discomfort and if done incorrectly subsequent health problems. Often these procedures are justified with the argument that a little pain now will prevent more pain later. Other procedures, such as confinement, medication, and research protocols (e.g., blood sampling, cannulation) also merit attention. Economics and research needs drive these, and careful attention and justification is warranted.

Less acute but still distressful are those issues related to the animals' environment. These issues are often related to climate, because beef cattle are normally raised completely outdoors in the United States. Although housing to ameliorate adverse climates exists, it is generally not economical for most producers to provide. Therefore, extreme natural conditions can result in cattle that are heat and/or cold stressed. Excessive dust and/or mud particularly in feedlot settings are environmental factors that can adversely affect welfare as well.

Another aspect of the environment is the relative abundance or scarcity of feed resources. Because beef cattle are often raised extensively with a seasonal restriction of nutrition, they undergo a subsequent loss of body fatness. Drought and the resulting overstocking for the available feed resources can also reduce body fatness. Thus, these natural temperature (acute) and nutritional stresses (chronic) are welfare issues potentially important in beef production.

The following is a short preview of the different sections that follow in this bibliography. While not complete, it introduces the reader to the recent work in the area relating to beef cattle production.

Behavior

Many references in the *Behavior* section deal with cattle temperament. Temperament is discussed with respect to the effects of breed (especially *Bos indicus* breeds), genetics, environment, and handling as well as the effects of temperament on carcass characteristics and performance. Numerous papers cover the area of human animal interrelationships, and low stress cattle handling. Several handling methods that potentially affect cattle behavior, pain, and stress are discussed such as dehorning, and castration, and branding. Some cover animal stress and how it relates to environment stimuli (e.g., noise, light) or handling practices. Another main focal area is on feeding/grazing behavior and effects of feeding management on behavior and performance of cattle.

Breeding

Most of the citations in the *Breeding* section are related to either genetic evaluation or to selection methods and criteria. Traditional breed evaluation continues; tropical breeds and

crosses were emphasized, although high marbling breeds like Wagyu were also included. Heterosis expected between breeds was often part of the research. Some papers covered effects for environments in specific countries (e.g. tropical adaptation), or bull tests. Newer tools for evaluation such as ultrasound for carcass evaluation and markers, microsatellites, QTL's, and genetic identification and other DNA methods are proliferating. A limited literature on new techniques in mixed model analysis was presented. Selection for traits and awareness of the interactions between traits was reported for growth, carcass composition, energetic efficiency, temperament, dystocia, endophyte fescue adaptation, and bull breeding soundness. Breeding objective definition and indexes are continually being developed, tested, and refined.

Feeding

A large section on *Feeding* is included in the bibliography. An update of the Seventh Edition of the NRC Nutrient Requirements of Beef Cattle, was published in 2000. Surveying this section, management strategy (e.g. limit feeding of high concentrate diets), energy expenditure, hormonal profile (IGF-1, somatotropin, and exogenous steroids or ractopamine) and their inter-relationships with metabolism, efficiency, and carcass characteristics is of great interest but will continue to provide challenges to researchers. Also, the appropriateness of various forms of energy or protein supplements for given production situations are on ongoing area of research, along with continuing interest in trace mineral (Cu, Mb, Se) needs and renewed interest in vitamins D and E for finishing cattle and their interaction with beef and carcass quality. There are a number of studies testing byproducts as beef cattle feeds including excreta from swine or poultry or their bedding, and further feed evaluation with new interest in novel grains such as high-oil corn, or genetically modified plants. Grain processing is also covered.

Grazing system affects nutritional intake, and research on continuous versus rotational grazing, timing of pasture use, the distribution of cattle and other grazing behavior continue. Matching seasonal forage supply with needs of the cow herd is critical, and supplemental feeding strategy, stocking rate, and even changing calving season effects on reproduction and calf productivity are under investigation. Antibiotic use is under scrutiny, and several papers deal with this issue. Also, the effect of different feeds on pathogenic bacteria is not resolved. Diet influence on methane and ammonia production, of interest for environmental effects, is being addressed. Heat stress may partially be alleviated by feeding strategy (timing, amount, and type of diet). Nutrition is inter-related with immunity.

General

The *General* section covers a wide range of welfare related topics from beef handling guidelines in the United States, European countries, and Australia, to sustain ability of beef production systems, agro-ecology, and organic farming. Most papers address these beef welfare issues on a national scale (e.g., Australia, New Zealand, Germany, Poland, Sweden, Canada).

Health

In 1998 The National Animal Health Monitoring System released a study of the health practices in the cow-calf segment of the beef production industry, and began a new study of the feedlot industry which has not yet been released. However, much has been published since the last NAL beef bibliography on disease and other conditions that affect beef cattle health. These include papers on acidosis, bloat, bovine herpes virus, bovine immune deficiency virus, bovine viral diarrhea, bovine respiratory disease, bovine respiratory syncytial virus, drug-induced hepatitis, dystocia, ectoparasites, leptospirosis, liver abscesses and flukes, mastitis, nematodes, neospora, poison plants, salmonella, and skin tumors. Feedlot health items covered are mass medication of (usually) incoming cattle and appropriate treatment protocols, the impact of feedlot diseases, and using techniques, such as infrared thermography, to detect inflammations such as fever or improper implant technique. Nutritional factors interact with immunity, in certain situations; trace minerals, probiotics, and vitamin E were shown to stimulate immune response or help prevent disease. Injection site lesions in meat were investigated for causes, including clostridial vaccinations. There were a few papers investigating the effect of potential environmental hazards (oil and gas wells, composting) on health.

Housing

A main focus of the Housing section is on prevention of heat and cold stress in cattle. Numerous papers address the use of shades, water sprinklers/misters, and windbreaks to mitigate adverse climatic effects. Climatic conditions have to be severe to show advantageous effects of e.g., shade on behavior, physiology, performance, and carcass characteristics. The main reason for this finding is that cattle are well adapted to a wide range of climates and have the ability to compensate for performance losses once stressful conditions are over. The area of

thermoregulation with respect to the animal's metabolism and physiology is discussed. Numerous papers address floor types and how they affect cattle lameness, cleanliness, performance, and carcass characteristics. Cattle preferences regarding floor type (floors covered with mats, sawdust, straw, or slatted floors) are presented.

Husbandry

The *Husbandry* section deals with issues related to potentially painful practices like castration, branding, implanting, and dehorning. Castration is discussed with respect to effects on performance, immunology, and inflammatory responses. Methods to control pain during castration like the use of novel anesthesia are discussed as well as recommendations given regarding age at castration to reduce welfare problems. Effects of branding methods from hot iron, over freeze- to sham-branding on cortisol levels and pain sensitivity are compared and hot iron branding identified as the most stressful method. Furthermore, branding method was identified as affecting the ease of movement through chutes. Several papers compare implant strategies and effects on beef cattle performance. Dehorning is identified as an important welfare issue related to production traits and welfare and several methods compared to minimize adverse effects on cattle welfare.

Production Systems and Management

A number of studies in the *Production Systems and Management* section focus on the sustain ability of beef production systems. Several go further and explore ethological and/or ecological aspects, including organic beef production and marketing. Also in this section are systems analysis studies of beef forage systems, costs and benefits of marketing alternatives, and relationships between costs of production and profit. Body composition models are included here due to the need for them in management systems to predict growth and market value. There are also a few papers on production in other countries. In particular finishing cattle in feedlots is increasing in a number of foreign locations. Rotation and other generally more intensive grazing practices, along with analysis of relative overstocking has been a growing area of interest. Finally, in the Production Systems and Management section are some references to other beef husbandry practices such as early weaning and changing the calving season.

Reproduction

Breeding or crossbreeding, particularly in the tropics between *Bos taurus* and *Bos indicus*, effects on reproduction have been investigated. Other factors looked at that affect reproduction were trace minerals, endophyte fescue, body condition score, calving season, antibiotic use, melengesterol acetate, age, and suckling. Estimators of fertility traits such as markers on sperm, scrotal or testicular size, whole milk progesterone, and monitoring devices were evaluated. Reproductive behaviors were related to exposure to the opposite sex before breeding, other mating stimuli, and group management factors. Systems analysis of reproduction and prediction of pregnancy rate were attempted. Estrus synchronization was a major area of study, with methods and protocols nutritional interactions, calf removal, number of inseminations and induced ovulation all targeted. Spaying, embryo transfers, caesarian sections are topics of further studies.

Slaughter

The factors affecting carcass quality, management (e.g., castration age and method) and growth path, nutrition, and genetics (breed, temperament traits) are of great concern. Models to account for some of these effects have been proposed, and composition prediction for growing or adult cattle are offered, as well as studies on breed and body condition effects on yield and value of cull cows. Ultrasound is used as a tool to estimate composition of live cattle, especially intramuscular and back fat. Myostatin, as well as the effect of intravenous glucose or electrolytes on meat quality was studied. Season and stocking pressure was related to stress susceptibility and incidence of dark cutters. Also, an evaluation of the USDA grading standards was reported. Conjugated linoleic acid, important for its health benefits, was higher in forage fed or organically produced beef.

Beef safety is another concern, with trace-back and electronic identification systems, or microbial contamination and its relation to diet and location of contamination in the forefront. Other studies investigated frequency of injection site lesions; estrogen residues in the animal; disease monitoring, especially tuberculosis at slaughter; and liver abscesses. Transport stress, and welfare and hygiene pre-slaughter, as well as vocalization and neuroendocrine response was correlated to handling or equipment problems at slaughter plants.

Transport

Transport issues are mainly discussed with respect to food safety and cattle welfare. Effects of cattle transport on food safety with respect to shedding of *Escherichia coli* O157, *Salmonella*, and *Campylobacter* are of concern and prevalence levels of these microbes discussed. Welfare issues related to transport are pre-transport cattle handling, transport distance, and space allowance. One paper offers tips for low stress handling.

The following bibliography will be of interest to scientists, veterinarians, extension specialists, students, and others, wishing to explore the broad range of current issues relating to the care and welfare of beef cattle. It is by no means complete but represents a sampling of the world wide literature available for review.

Bibliography

This section should be of interest to researchers, graduate students, extension specialists, and veterinarians. Citations were selected from scientific journals, texts, and proceedings from the years 1997-2003.

Behavior

Albright, J.L.; Arave, C.W. (1997). *The Behaviour of Cattle* CAB International: Wallingford, UK, 306 p., ISBN: 0-85-199196-3.

NAL Call Number: SF202.5 A43 1997.

Keywords: animal production, animal welfare, dairy cattle, beef cattle, maternal and calf behavior, behavioral responses to management systems, human-cattle interactions, training cattle, social behavior, reproductive behavior, feeding behavior.

Alencar, M.M. de; Tullio, R.R.; Cruz, G.M. da; Correa, L. de A. (1996). **Grazing behavior of beef cows. [Comportamento de pastejo de vacas de corte.]** *Revista da Sociedade Brasileira de Zootecnia* 25(1): 13-21, ISSN: 0100-4859.

NAL Call Number: SF1 R45.

Keywords: beef cattle cows, grazing systems, animal feeding, behavior, feeding habits, feeding systems, Portuguese language, Brazil.

Apley, M. (1999). **Buller syndrome in feedlot steers.** *The Compendium on Continuing Education for the Practicing Veterinarian* 21 (11): S250-S256, S264, ISSN: 0193-1903.

NAL Call Number: SF601.C66.

Keywords: steers, standing reflex, sexual behavior, abnormal behavior, implantation, growth promoters, zeranol, estrogens, trenbolone, diethylstilbestrol, stress, removal, cattle feeding, social dominance.

Bailey, D.W.; Sims, P.L. (1998). **Association of food quality and locations by cattle.** *Journal of Range Management* 51(1): 2-8.

NAL Call Number: 60.18 J82.

Abstract: Twelve yearling steers were observed in an 8-arm radial maze to determine the strength of the association between food quality and spatial locations following a 0- or 30-day delay. The study was conducted using 3 qualities of feed, low (straw), medium (alfalfa pellets), and high (grain). During phase 1, all 8 arms contained dehydrated alfalfa pellets. In phase 2, steers were fed either grain or wheat straw, in 2 arms (key arms). The remaining 6 arms contained alfalfa pellets. Six steers received straw in key arms, and 6 received grain. Key arms varied among steers and were selected so a change in arm selection patterns between phases would clearly be associated with corresponding changes in food quality. Straw was placed in arms that steers selected first during phase 1, and grain was placed in arms that were selected last in phase 1. Phase 3 began after a 0- or 30-day delay following phase 2. In this phase, all arms contained alfalfa. Steers rarely reentered a previously entered arm indicating an accurate spatial memory for food location. The sequence of arm selections in phase 2 changed ($P < 0.05$) from the pattern established in phase 1, which demonstrated that cattle can associate food quality with spatial locations. The delay between phase 2 and 3 did not affect ($P > 0.05$) the selection patterns of steers that had grain in key arms, but did appear to affect the number and sequence of arm entries for steers receiving low quality food in key arms during phase 2. With no delay, steers that received straw in phase 2 did not enter key arms on the first day of phase

3, but after 30 days animals entered and consumed food in key arms. Steers with no delay entered key arms fewer ($P = 0.03$) times during phase 3 than steers that began 30 days later. This suggests that strength of the association between food quality and spatial locations can decline over time.

Keywords: steers, beef cattle, learning ability, spatial distribution, wheat straw, alfalfa pellets, feed grains, palatability, feeding behavior, nutritive value, memory, food preferences.

Becker, B.G.; Lobato, J.F.P. (1997). **Effect of gentle handling on the reactivity of zebu crossed calves to humans.** *Applied Animal Behaviour Science* 53(3): 219-224. ISSN: 0168-1591.

NAL Call Number: QL750 A6.

Keywords: calves, crossbreds, handling, animal behavior, behavior patterns, beef production, relationships, handling, human animal relationships.

Blackshaw, J.K.; Blackshaw, A.W.; McGlone, J.J. (1997). **Buller steer syndrome review.** *Applied Animal Behavior Science* 54 (2/3): 97-108, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: cattle, steers, sexual behavior, social behavior, stress, animal welfare, economic impact, feedlots, intensive livestock farming.

Boenner, S. (1997). **Development, quality and continuation of the human-farm animal-relationship during a pasturing period. [Ausbildung, Qualitaet und Fortbestand der Mensch-Tier-Beziehung im Verlauf einer Weideperiode.]** In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL: Braunschweig-Voelkenrode, Germany, pp. 164-171, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: beef cattle, cows, mothers, human animal relationships, behavior, grazing systems, extensive husbandry, Germany, European Union, German language.

Boenner, S. (1997). **Mother-offspring-relationship during the pasture period with alterative herd size and formation. [Mutter-Nachkommen-Beziehung im Verlauf der Weideperiode bei sich aendernder Herdengroesse und -struktur.]** In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL: Braunschweig-Voelkenrode, Germany, pp. 203-212, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: cows, mothers, calves, maternal behavior, weight gain, growth, Germany, European Union, German language.

Boivin, X.; Garel, J.P.; Mante, A.; Le Neindre, P. (1998). **Beef calves react differently to different handlers according to the test situation and their previous interactions with their caretaker.** *Applied Animal Behaviour Science* 55(3/4): 245-257. ISSN: 0168-1591.

NAL Call Number: QL750 A6.

Keywords: calves, handling, identification, human behavior, animal behavior, relationships, interactions, stockmen, feeding, France.

Boivin, X.; Garel, J.P.; Durier, C.; Neindre, P. Le (1998). **Is gentling by people rewarding for beef calves?** *Applied Animal Behaviour Science* 61(1): 1-12, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Abstract: The perception to petting and brushing (gentling) by man was investigated in 41 beef calves reared with twice daily sucklings under human control. At 1.5 months, they were allocated to one of three treatments. For 5 minutes a day, 5 days a week for 2 weeks they were socially isolated (treatment IS, 13 calves), or with a stationary stockman who brushed the calf when it approached (treatment PR, 14) or with a stockman approaching and brushing the calf (treatment BR, 14). All of the BR calves accepted brushing easily within 5 days of treatment. All of the PR calves briefly interacted with the stockman within 3 days, but by the end of the treatment, none were interacting with the stockman. Two tests were performed on 2 consecutive days after the end of the treatments and 1 month later, in the familiar environment of the treatment procedures. The test procedure included social isolation (1 minute), isolation with the stationary stockman (1.5 minutes) and isolation with the stockman trying to stroke the calf (1.5 minutes). Few animals approached within 2 m of the stockman during the tests and BR calves tended to stay more than 4 m away from him ($P = 0.1$). Just after the treatment period, BR animals allowed more stroking by the stockman ($P < 0.01$) on the 2 days of tests and were more motionless ($P < 0.01$) on the first day of testing than animals from the 2 other treatments. On the second day of testing, both BR and PR calves were more motionless ($P < 0.01$) than IS animals. However, all the animals appeared more tolerant 1 month later and no significant difference was found at this age. Acceptance of contact such as brushing or stroking appears to be more the result of a habituation process than one of positive reinforcement.

Keywords: beef cattle calves, behavior, human interaction, perception. Copyright© 2003, CAB International.

Boivin, X.; Garel, J.P.; Neindre, P. le (1996). **The importance of rearing management at a young age and artificial weaning on the establishment of the human-animal relationship in beef cattle and goats. [Importance du mode d'élevage dans le jeune âge ou lors du sevrage sur l'établissement des relations homme-animal chez les bovins allaitants et chez les caprins.]** In: *3emes rencontres autour des recherches sur les ruminants Paris, France, 4 et 5 decembre 1996* Institut l'Elevage: Paris, France, pp. 245-248, ISBN: 2-841-48-022-4.

Keywords: beef cattle, goats, behavior, management, young animals, animal welfare, weaning, feeding, French language.

Burrow, H.M.; Corbet, N.J. (2000). **Genetic and environmental factors affecting temperament of zebu and zebu, derived beef cattle grazed at pasture in the tropics.** *Australian Journal of Agricultural Research* 51 (1): 155, 162. ISSN: 0004-9409.

NAL Call Number: 23 Au783.

Keywords: Zebu, breed, steers, heifers, bull calves, genetics, environmental effects, temperament, behavior, flight speed, genetic factors, selection, tropical pasture grazing, Australia.

Burrow, H.M.; Shorthose, W.R.; Stark, J.L. (1999). **Relationships between temperament and carcass and meat quality attributes of tropical beef cattle.** In: *Rising to the Challenge, Breeding for the 21st Century Customer. Proceedings of the Thirteenth Conference Association for the Advancement of Animal Breeding and Genetics, Mandurah, Western Australia, 4th-7th July 1999*, Association for the Advancement of Animal Breeding and Genetics: Armidale, Australia, pp. 227-230, ISBN: 0-9586299-0-0.

Keywords: weanling beef calves, yearlings, animal behavior, temperament, flight speed score, weighing crush, meat quality, carcass quality,

Burrow, H.M. (1998). **The effects of inbreeding on productive and adaptive traits and temperament of tropical beef cattle.** *Livestock Production Science* 55(3): 227-243, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: Zebu, breed, inbreeding, growth, fertility, disease resistance, growth, fertility, feed conversion efficiency, adaptive traits, resistance to cattle ticks, gastrointestinal helminths, buffalo flies and heat stress, meat quality, temperament, flight speed, carcass composition, body weight, performance, tropics, parasites, adaptation, Australia.

Burrow, H.M. (1997). **Measurements of temperament and their relationships with performance traits of beef cattle.** *Animal Breeding Abstracts* 65 (7): 477-495, ISSN: 0003-3499.

NAL Call Number: 241 IM72RA.

Keywords: beef breeds, breed differences, temperament, standardized scoring system, relationships, performance, traits, evaluation, meat quality, behavior, heritability, breeding, growth, milk yield, carcasses, disease resistance, reviews.

Buskirk, D.D.; Zanella, A.J.; Harrigan, T.M.; Van Lente, J.L.; Gnagey, L.M.; Kaercher, M.J. (2003). **Large round bale feeder design affects hay utilization and beef cow behavior.** *Journal of Animal Science* 81 (1) 109-115, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: feeding, feeding behavior, aggressiveness, agonistic behavior, efficiency, performance evaluation, feed dispensers.

Chirase, N.K.; Greene, L.W.; Graham, G.D.; Avampato, J.M. (2001). **Influence of clostridial vaccines and injection sites on performance, feeding behavior, and lesion size scores of beef steers.** *Journal of Animal Science* 79(6): 1409-1415.

NAL Call Number: 49 J82.

Abstract: Several clostridial vaccines are currently being used in the beef cattle industry. Of greatest concern is altering the location and route of administration of these vaccines to reduce injection-site lesions while maintaining seroconversion. Two experiments were conducted to determine the effect of clostridial vaccines and injection sites on the performance, feeding behavior, and lesion size scores of beef steers. In Exp.1, 80 crossbred beef steers (BW 237 +/- 3.2 kg) were allotted randomly into five groups and given 14d to adapt to the feed and individual feed intake-monitoring devices (Pinpointer devices) before starting the study. Each group was assigned randomly to one of the following vaccination treatments: 1) control (sterile saline water), 2) Alpha-7 Ear (A7E), 3) Alpha-7 Prescapula (A7P), 4) Vision-7 Prescapula (V7P), and 5) Ultrabac-7 Prescapula U7P). All vaccines were injected s.c. in the ear or prescapular region, and injection sites were palpated on d 0 and 28 (Exp. 1) and on d 63 and 91

(Exp. 2). The protocol for Exp. 2 was exactly the same as for Exp. 1 except treatments included control, A7P, Alpha-CD Ear(ACDE), Alpha-CD Prescapula (ACDP), Fortress-7 Prescapula (F7P), and V7P. Also, control and steers receiving F7P and V7P were revaccinated on d 63 and palpated on d 91. Results of Exp. 1 indicated that the A7E and U7P steers had a feed intake lower ($P < 0.01$) than all other treatment groups. The ADG of the A7P and A7E steers were not different ($P > 0.05$) from those of the control steers. The gain:feed ratio of the A7E steers was 41% higher ($P < 0.01$) than that of the V7P steers (Exp. 1). The results of Exp. 2 indicated that the control, ACDP, and V7P steers had greater ($P < 0.01$) ADG than all other treatment groups, sizes differed by vaccine and injection site in both experiments. These data suggest that vaccinating beef steers s.c. in the ear produced gain: feed ratios and lesion size scores that were similar to prescapular vaccinations. However, more research is required to determine the immune response but the gain:feed ratios were not different ($P > 0.05$) among all treatment groups. Lesion of vaccinating cattle in the ear.

Keywords: steers, clostridium, spatial variation, vaccines, performance, feeding behavior, lesions, size, feed intake, subcutaneous injection, ears, application date, live weight gain, feed conversion efficiency, immune response.

Cote, S. (In Progress). *Stockmanship: Powerful Tool for Grazing Management* United States Department of Agriculture, Natural Resources Conservation Service, Idaho

Keywords: beef cattle, handling, behavior, grazing management tool, moving cattle, low stress, reduced disease incidence, increased productivity.

Cowan, J.B. (1997) **Safety around beef cattle.** In: *Safety and Health in Agriculture, Forestry, and Fisheries*, Langley, R.L., McLymore, R.L., Meggs, W.J., and Roberson, G.T, eds., Government Institutes, Inc.: Rockville, USA, pp. 291-313, ISBN: 0-86587-552-9.

NAL Call Number: RC965 A5 S24 1997.

Keywords: trauma, beef cattle, handling, animal behavior, human injuries, occupational hazards, health and safety at work.

Deswysen, A.G.; Dutilleul, P.; Fischer, V.; Campbell, C.P. (1997). **Quantitative analysis of nycterohemeral eating and ruminating patterns in beef cattle fed pelleted concentrates with or without supplemental roughage.** *Canadian Journal of Animal Science* 77 (3): 375-384, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: Hereford steers, breed, quantitative analysis, eating, patterns, concentrates, roughage, timothy hay, feeding behavior, rumination, pelleted feeds, mastication, lucerne pellets, time spent eating.

Dobicki, A. (2000). **Variability in behavioral hierarchy of mixed beef cattle herd grazing mountainous pasture.** [Zmiennosc behawioralnej hierarchii w mieszanym stadzie bydla miesnego wypasanego na pastwisku gorskim.] *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 375(24): 211-218, ISSN: 1232-3071.

Keywords: mixed breeds, suckler cows, behavior, rank, distance, dominance, submissiveness, herd dynamics, grazing, pasture systems, highlands, computer software, Polish language.

Eng, K. (1997). **Research addresses behavior, restricted intake on performance.** *Feedstuffs* 69(20): 19, 28.

NAL Call Number: 286.81 F322.

Keywords: heifers, steers, temperament, lambs, unrestricted feeding, feed intake, performance.

Fehmi, J.S.; Karn, J.F.; Ries, R.E.; Hendrickson, J.R.; Hanson, J.D. (2002). **Cattle grazing behavior with season-long free-choice access to four forage types.** *Applied Animal Behaviour Science* 78 (1): 29-42, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: beef cattle, steers, grazing, sown grasslands, bromus inermis, agropyron desertorum, elymus smithii, botanical composition, rangelands, feeding preferences, seasonal variation, grazing intensity, continuous grazing, rotational grazing, spatial variation, native range, North Dakota.

Fell, L.R.; Colditz, I.G.; Walker, K.H.; Watson, D.L. (1999). **Associations between temperament, performance and immune function in cattle entering a commercial feedlot.** *Australian Journal of Experimental Agriculture* 39(7): 795-802.

NAL Call Number: 23 Au792.

Keywords: feedlots, animal behavior, performance, immune response, weaning, identification, prediction, finishing, steers, handling, blood chemistry, hydrocortisone, live weight gain, morbidity, leukocytes, lymphocyte transformation, interferon, neutrophils, natural killer cells, IGa, igm, peroxidases, lymphocytes.

Fisher, A.D.; Morris, C.A.; Matthews, L.R. (2000). **Cattle behaviour: comparison of measures of temperament in beef cattle.** *Proceedings of the New Zealand Society of Animal Production* 60: 214-217, ISSN: 0370-2731.

NAL Call Number: 49.9 N483.

Keywords: temperament, animal behavior, measurement, tests.

Fjerdingsby, N.; Waage, S. (2003). **Comparison of two methods for the dehorning of calves. [Sammenligning av to metoder for avhorning av kalv.]** *Norsk Veterinaertidsskrift* 115 (1): 7-15, ISSN: 0332-5741.

NAL Call Number: 41.8 N81.

Keywords: calves, Norwegian Red, breed, crossbred, dehorning, electrical hot-iron tool, Leister-Ghibli, hot-air gun, comparison, sedative, local anaesthetic, plasma cortisol, behavioral testing, human contact test, discomfort, pain, Norwegian language.

Fordyce, G.; Fitzpatrick, L.A.; Cooper, N.J.; Doogan, V.J.; Faveri, J. de; Holroyd, R.G. (2002). **Bull selection and use in northern Australia. 5. Social behaviour and management.** *Animal Reproduction Science* 71 (1/2): 81-99, ISSN: 0378-4320.

NAL Call Number: QP251.A5.

Keywords: behavior, breeding, animal husbandry, Brahman, breed, crossbreds, bulls, calf production, calves, conception rate, extensive husbandry, male fertility, mating systems, paternity, DNA typing, performance testing, reproduction, reproductive performance, selection, sire evaluation, social behavior, Australia.

Gauly, M.; Mathiak, H.; Erhardt, G. (2002). **Genetic background of behavioural and plasma cortisol response to repeated short-term separation and tethering of beef calves.** *Journal of Animal Breeding and Genetics* 119 (6): 379-384, ISSN: 0931-2668.

NAL Call Number: 442.8 Z35.

Keywords: beef cattle, beef breeds, German Simmental, German Angus, blood chemistry, behavior, breed differences, calves, genetic effects, heritability, hydrocortisone, sex differences, stress, stress response, temporary calf removal, tethering.

Gauly, M.; Mathiak, H.; Kraus, M.; Hoffmann, K.; Erhardt, G. (2001). **Difference in temperament of beef cattle regarding breed and sex.** [Rasse- und Geschlechtsunterschiede im Temperament von Kalbern in Mutterkuhhaltung.] *Deutsche Tierärztliche Wochenschrift* 108(5): 206-210, ISSN: 0341-6593.

NAL Call Number: 41.8 D482.

Keywords: calves, cows, bulls, Aberdeen-Angus, German Simmental, breed differences, sex differences, behavior, temperament, handling, German language.

Gazzola, C.; Jeffery, M.R.; White, D.H.; Hill, R.A.; Reid, D.J. (2002). **Effect of delayed castration on the growth rate, behaviour and serum insulin-like growth factor-1 concentration of beef cattle on tropical pasture.** *Animal Science: An International Journal of Fundamental and Applied Research* 75 (1): 41-47, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Keywords: beef cattle, breed differences, behavior, castration, age at castration, estradiol, growth promoting implants, growth rate, insulin-like growth factor, liveweight gain, carcass fat, Australia.

Gibb, D.J.; Schwartzkopf-Genswein, K.S.; Stookey, J.M.; McKinnon, J.J.; Godson, D.L.; Wiedmeier, R.D.; McAllister, T.A. (2000). **Effect of a trainer cow on health, behavior, and performance of newly weaned beef calves.** *Journal of Animal Science* 78(7): 1716-1725, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: cows, trainer, beef calves, weaned, behavior, performance, health, feeding patterns, haptoglobin, leukotoxin antibody, body weight gain, rectal temperature.

Golda, J.; Kohoutek, A. (2002). **Utilization of grasslands by agrotechnical and management practices for efficient beef cattle and suckler cows husbandry.** [Vyuziti drnoveho pudniho fondu pratotechnickymi a pratoutilizacnimi postupy pro efektivni chov skotu bez trzni produkce mleka.] *Vyzkum v Chovu Skotu* 44(2): 17-18, ISSN: 0139-7265.

Abstract: This article summarizes the main objectives and stages of a project which aims to assess the utilization of pastures and permanent meadows by cattle in less favourable production areas in the Czech Republic. The project includes especially: 1) evaluation of different grass and clover mixtures, 2) assessment of optimal grass varieties in order to extend the grazing period, 3) evaluation of the effect of grazed grasslands on the landscape formation, 4) assessment of botanical diversity of permanent grasslands, 5) evaluation of different grazing methods, 6) monitoring cattle behaviour, 7) economical analyses.

Keywords: beef cattle, suckler cows, heifers, feed grasses, meadows, pasture improvement, grazing, soil amendments, yield factors, behavior, feeding habits, feeds, grasses, natural resources, nonrenewable resources, Czech language, Czech Republic.

Goonewardene, L.A.; Price, M.A.; Okine, E.; Berg, R.T. (1999). **Behavioral responses to handling and restraint in dehorned and polled cattle.** *Applied Animal Behaviour Science* 64(3): 159-167. ISSN: 0168-1591.

NAL Call Number: QL750 A6.

Keywords: calves, polled condition, horns, dairy cattle, beef cattle, restraint of animals, cattle husbandry, animal behavior.

Gottardo, F.; Fregolent, G.; Preciso, S.; Cozzi, G.; Ragno, E.; Bianchi, C.; Mazzini, C.; Andrighetto, I. (2002). **Welfare of beef cattle. [Il benessere dei bovini allevati per la produzione di carne.]** *Informatore Agrario* 58 (6): 35-39, ISSN: 0020-0689.

NAL Call Number: 281.8 IN32.

Keywords: animal welfare, beef cattle, standards, EC Scientific Committee on Animal Health and Animal Welfare, stress, housing, feed access, aggressive behavior, diet, health, loading, unloading, Italian language, Italy.

Grandin, T. (2001). **Cattle vocalizations are associated with handling and equipment problems at beef slaughter plants.** *Applied Animal Behaviour Science* 71(3): 191-201, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Abstract: Vocalization of cattle in commercial slaughter plants is associated with observable aversive events such as prodding with electric prods, slipping in the stunning box, missed stuns, sharp edges on equipment or excessive pressure from a restraint device. A total of 5806 cattle were observed during handling and stunning in 48 commercial slaughter plants in the United States, Canada and Australia during the calendar year of 1999. Each animal was scored as either a vocalizer or a nonvocalizer. In 20 plants (42%), 0-1% of the cattle vocalized, in 12 plants (25%) 2-3% vocalized, in 12 plants (25%) 4-10% vocalized and in four plants (8%) more than 10% vocalized. In three plants repeated use of an electric prod on 95% or more of the cattle that balked and refused to move was associated with vocalization percentages of 17, 16 and 12%. In five plants, the percentage of cattle that vocalized was reduced by making modifications to plant equipment. Reducing the voltage on a rheostat controlled electric prod reduced the vocalization percentage from 7 to 2% in the first plant. In three other plants, the incidence of cattle backing up and balking was reduced by illuminating a dark entrance or adding a false floor to a conveyor restrainer. A false floor eliminates the visual cliff effect. The percentage of cattle that vocalized was reduced from 8 to 0%, 9 to 0% and 17 to 2%. Since balking was reduced, electric prod use was also reduced. In the fifth plant, reduction of the pressure exerted by a neck restraint reduced the percentage of cattle that vocalized from 23 to 0%. In the five plants where modifications were made, a total of 379 cattle were observed prior to equipment modifications and 342 after modification. The mean percentage of cattle that vocalized was 12.8% before the modifications and 0.8% after the modifications ($P < 0.001$). Vocalization scoring can be used to identify handling and equipment problems that may compromise animal welfare.

Keywords: abattoirs, commercial slaughter plants, behavior, animal welfare, stress, vocalization, aversive events, prodding with electric prods, slipping in the stunning box, missed stuns, sharp edges on equipment, excessive pressure from a restraint device, facility and equipment modifications, proper lighting, false floors, reduced voltage of electric prod, Australia, Canada, USA. Copyright© 2003, CAB International

Grandin, T. (1999). **Easy tips for low stress cattle handling.** *Large Animal Practice* 20 (5): 28, 30-33.

NAL Call Number: SF601 B6.

Keywords: beef cattle, dairy cattle, handling, transport, stress, trauma, milk, milking, reproduction, techniques, immune response.

Grignard, L.; Boivin, X.; Boissy, A.; Neindre, P. le (2001). **Do beef cattle react consistently to different handling situations?** *Applied Animal Behaviour Science* 71(4): 263-276, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: animal behaviour, heifers, Limousin (cattle breed), genetic variation, handling, isolation, restraint of animals, human presence, reaction to humans.

Grignard, L.; Boissy, A.; Boivin, X.; Garel, J.P.; Le Neindre, P. (2000). **The social environment influences the behavioural responses of beef cattle to handling.** *Applied Animal Behaviour Science* 68(1): 1-11. ISSN: 0168-1591.

NAL Call Number: QL750 A6.

Keywords: calves, cattle breeds, Limousine temperament, handling, stress, social environment, social behavior, animal behavior, docility test, fearfulness, visual stimuli, handling.

Guetter, O. (1997). **Person to animal relationship with a suckler cow herd.**

[**Untersuchungen zur Mensch-Tier-Beziehung an einer Mutterkuhherde.**] In: 3.

Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL:

Braunschweig-Voelkenrode, Germany, pp. 240-242, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: beef cattle, cows, mothers, human animal relationships, free range husbandry, extensive husbandry, Germany, European Union, German language.

Hartmann, J.; Schlichting, M.; Langholz, H.J. (1996). **Studies on improving beef testing systems on station. 2. Automation of feeding of standardized test diet.** [**Untersuchungen zur Weiterentwicklung der Stationsprufung auf Fleischleistung beim Rind. 2.**

Automatisierung der Fuetterung einer Standardprufdiat] *Archiv fur Tierzucht* 39 (2): 107-119, ISSN: 0003-9438.

NAL Call Number: 49 AR23.

Keywords: bulls, housing systems, automation, transponders, equipment, floors, straw, litter, slatted floors, behavior, feed intake, estimation, automatic feed dispensers, German language.

Hassoun, P. (2002). **Cattle feeding behaviour at pasture: A methodology related to on farm measurements.** *Animal Research* 51 (1): 35-41.

Abstract: In order to study the effects of herbage allowance on cattle behaviour activities on the farm, some methodological aspects had to be defined. Two sets of observations have been conducted on farm using a beef suckler herd containing 24 cows and managed in a rotational grazing system including a total of 6 paddocks. Behaviour activities were recorded on two successive paddocks. In set 1, the herd activities were recorded every 5 min in daylight and 15 min at night for the first two days on the two paddocks. In set 2, ten cows were individually identified among the same herd. On the first and the last day on the two paddocks, daylight activities were recorded with 5-min frequencies. From these individual observations, total grazing and ruminating duration were calculated, simulating records every 5, 10, 15 and 20 min. In set 1, 76% of the total grazing and 28% of the total ruminating activities occurred in

daylight. Grazing started at dawn and finished at dusk. In set 2, grazing activity followed the same pattern as in set 1 in daylight. Whatever the frequency of the records, grazing and ruminating time were not significantly ($P > 0.05$) different. However the 10 min frequency gave fewer and lower individual differences than the 15 and 20 min frequencies, compared to the original record (5 min). It is concluded that visual observations of cattle managed in a rotational grazing system can be readily undertaken at the farm level with 5 to 20 min frequencies.

Keywords: feeding behavior, dark, daylight, pasture, rotational grazing, rumination.

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Hemsworth, P.H.; Price, E.O.; Borgwardt, R. (1996). **Behavioural responses of domestic pigs and cattle to humans and novel stimuli.** *Applied Animal Behaviour Science* 50 (1): 43-56, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: pigs, beef cattle, handling, responses, stimuli, novel objects, previous exposure, animal behavior, human approach tests.

Hirata, M.; Iwamoto, T.; Otozu, W.; Kiyota, D. (2002). **The effects of recording interval on the estimation of grazing behavior of cattle in a daytime grazing system.**

Asian-Australasian Journal of Animal Sciences 15 (5): 745-750, ISSN: 1011-2367.

NAL Call Number: SF55.A78A7.

Keywords: beef cattle, beef cows, calves, grazing systems, animal behavior, data collection, errors, techniques, estimation, *paspalum notatum*, rumination, grazing.

Howery, L.D.; Bailey, D.W.; Ruyle, G.B.; Renken, W.J. (2000). **Cattle use visual cues to track food locations.** *Applied Animal Behaviour Science* 67(1/2): 1-14. ISSN: 0168-1591.

NAL Call Number: QL750 A6

Keywords: foraging, memory, learning ability, spatial variation, visual stimuli, feeding preferences, feeding behavior, feed intake, individual characteristics.

Ingrand, S.; Agabriel, J.; Dedieu, B.; Lassalas, J. (2001). **Effects of reducing access to food on intake and feeding behaviour of loose-housed dry Charolais cows.** *Animal Research* 50(2): 145-148.

Keywords: Charolais cows, breed, food intake, feeding behavior, hay ad libitum, feeding from mangers, nutritional requirements.

Ingrand, S. (2000). **Feeding behaviour, intake and performance in beef cattle managed in group. [Comportement alimentaire, quantites ingerees et performances des bovins conduits en groupe.]** *Productions Animales* 13(3): 151-163, ISSN: 0990-0632.

NAL Call Number: SF1.P77

Keywords: feeding habits, livestock management, nutritional requirements, nutrient intake, animal performance, behavior, physiological requirements, French language.

Ingrand, S.; Agabriel, J.; Dedieu, B.; Lassalas, J. (2000). **Effects of within-group homogeneity of physiological state on individual feeding behaviour of loose-housed Charolais cows (beef cow). [Effets de l'homogeneite intra-lot des stades physiologiques sur le comportement alimentaire de vaches Charolaises conduites en stabulation libre [vache allaitante, alimentation en groupe.]** *Annales de Zootechnie* 49(1): 15-27, ISSN: 0003-424X.

NAL Call Number: 49 F84.

Keywords: cows, beef cattle, housing, feed intake, behavior, feeding habits.

Ingrand, S.; Agabriel, J.; Lassalas, J.; Dedieu, B. (1999). **How group feeding influences intake level of hay and feeding behaviour of beef cows.** *Annales de Zootechnie* 48 (6): 435-444, ISSN: 0008-424X.

NAL Call Number: 49 F84.

Keywords: beef cattle, beef cows, group effect, behaviour, feeding behavior, hay, dry matter, feed intake, nutrition programs, housing, loose housing, milk, milk yield, management, nutrient requirements, winter, cow housing, French language.

Ingrand, S.; Agabriel, J.; Lassalas, J. (1997). **Individual feeding vs group feeding for Charolais cows. [Comportement d'ingestion de vaches Charolaises conduites a l'attache ou en stabulation libre.]** In: *Proceedings of the 4. meeting "Rencontres autour des recherches sur les ruminants". Paris (France), December 4 and 5 1997 [4. Rencontres autour des recherches sur les ruminants. Paris (France), les 4 et 5 decembre 1997]* Institut de l'Elevage: Paris, France, p.91, ISBN: 2-84148-026-7.

Keywords: cows, housing, tethered stalls, hay, feed intake, feeding habits, feeds, husbandry methods, behavior, French language, France.

Jago, J.G.; Matthews, L.; Bass, J.J.; Knight, T.W. (1996). **A comparison of two methods of castration on post, pubertal beef cattle and their effect on behaviour, growth and ultimate pH.** *Proceedings of the New Zealand Society of Animal Production* 56 (0): 394-397, ISSN: 0370-2731.

NAL Call Number: 49.9 N483.

Keywords: bulls, steers, pubertal, effects of surgical and immunocastration, sexual behavior, aggressive behavior, plasma testosterone growth, slaughter, meat quality, hot carcass weight, pH, body weight, carcass weight, carcass composition.

Kiley-Worthington, M.; Randle, H.D. (1999). **The criteria for ethologically and ecologically raised beef.** *Biological Agriculture and Horticulture* 16 (4): 369-380, ISSN: 0144-8765.

NAL Call Number: S605.5 B5

Abstract: The problems of beef production, including concerns about animal welfare, undesirable environmental effects, inability to be economically viable without subsidies from the public purse, and, recently, in the light of the B.S.E. crisis, possible concern for public health, are discussed. The criteria for improved animal welfare, including reduced behavioural restriction, are examined in order to work towards developing "ethologically sound" environments. The criteria for assessing the ecological effect of the beef producing enterprise are also outlined. One suggested way of reducing environmental and animal welfare problems is the production of suckled beef on ecological farms if this can be economic.

Keywords: beef production, animal welfare, behavioral restriction, bovine spongiform encephalopathy, public health concerns, profitability, environmental impact, animal husbandry, meat production, UK. Copyright© 2003, CAB International

Kiley-Worthington, M.; Randle, H.D. (1999). **The practicalities and economics of ethologically and ecologically raised double suckled beef.** *Biological Agriculture and Horticulture* 16(4): 381-393, ISSN: 0144-8765.

NAL Call Number: S605.5 B5.

Abstract: It is widely believed that beef production fulfilling the majority of the criteria for ethological and ecological husbandry is less productive and less economic than conventional beef production. It is commonly believed that organic ethologically and ecologically sound

beef production must rely on premium prices. The management, production and economic performance from 1990 to 1996 of a herd of double suckling South Devon cattle on an ecological farm within the Dartmoor National Park, U.K., indicates that animal welfare, ecological, public health and aesthetic concerns can be dramatically reduced, and that this can be accompanied by better economic performance than on conventional suckler systems. The management system is outlined and its strengths and weaknesses assessed.

Keywords: South Devon, breed, economic analysis, profitability, ethics, nature conservation, sustainability, organic farming, animal welfare, suckling, animal husbandry, farm management, public health, animal behavior, beef production, England.

Kosako, T.; Imura, T. (2000). **Effects of early training and rearing conditions on the movability of Japanese black cattle using ropes.** *Animal Science Journal* 71(7): 75-81, ISSN: 1344-3941.

NAL Call Number: SF1 A542.

Keywords: calves, breed, Japanese Black, behavior, early training, training to lead, handling, rearing techniques, human interaction, Japanese language.

Kosako, T.; Imura, T. (1999). **Behavioral characteristics of Japanese black calves [*Bos taurus*] during leading training in the first seven days after birth.** *Animal Science Journal* 70(10): 415-420, ISSN: 1344-3941.

NAL Call Number: SF1 A542.

Keywords: calves, breed, Japanese Black, social behavior, training, training to lead, human interaction, Japanese language.

Kosako, T.; Imura, T. (1999). **Effect of handling treatment during three days after birth on the subsequent reaction to humans in Japanese black calves (*Bos taurus*).** *Animal Science Journal* 70(10): 409-414, ISSN: 1344-3941.

NAL Call Number: SF1 A542.

Keywords: calves, breed, Japanese Black, social behavior, training, training to lead, human interaction, Japanese language.

Kosako, T.; Imura, T. (1999). **Effect of housing conditions and human contact on temperament of Japanese black calves.** *Animal Science Journal* 70(9): 205-210, ISSN: 1344-3941.

NAL Call Number: SF1 A542.

Keywords: animal housing, handling, meat animals, Japanese language, Japan.

Ksiksi, T.; Laca, E.A. (2000). **Can social interactions affect food searching efficiency of cattle?** *The Rangeland Journal* 22(2): 235-242.

NAL Call Number: SF85.4 A8A97.

Keywords: social behavior, feeding behavior, grazing, learning, foraging, uniform grazing patterns.

Laca, E.A.; WallisDeVries, M.F. (2000). **Acoustic measurement of intake and grazing behaviour of cattle.** *Grass and Forage Science: The Journal of the British Grassland Society* 55(2): 97-104.

NAL Call Number: 60.19 B773.

Keywords: steers, grazing, animal behavior, feed intake, feeding behavior, acoustics, mastication, grass sward, cutting, height, *setaria pumila*, plant height, nitrogen fertilizers, application rates, sounds, prediction, estimation, chewing sounds.

Landaeta-Hernandez, A.J.; Yelich, J.V.; Lemaster, J.W.; Fields, M.J.; Tran, T.; Chase, C.C., Jr.; Rae, D.O.; Chenoweth, P.J. (2002). **Environmental, genetic and social factors affecting the expression of oestrus in beef cows.** *Theriogenology* 57 (4): 1357-1370, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5.

Keywords: cows, breed differences, Senepol, Brahman, behavior, social dominance, estrus prostaglandins, reproductive behavior, mounting, estrus synchronization, environmental factors, temperature, humidity, subtropical environments, Florida; USA.

Lanier, J.L.; Grandin, T.; Green, R.; Avery, D.; McGee, K. (2001). **A note on hair whorl position and cattle temperament in the auction ring.** *Applied Animal Behaviour Science* 73(2): 93-101, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: auction ring behavior, behavioral scoring, calm, agitated, relationship to facial hair patterns, temperament, breed differences, *Bos taurus* beef breeds, *Bos indicus* beef breeds, Holsteins, Colorado, Texas.

Lanier, J.L.; Grandin, T.; Green, R.D.; Avery, D.; McGee, K. (2000). **The relationship between reaction to sudden, intermittent movements and sounds and temperament.** *Journal of Animal Science* 78 (6): 1467-1474, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Casual observations indicated that some cattle are more sensitive to sudden movement or intermittent sound than other cattle. Six commercial livestock auctions (5 located in Colorado and 1 in Texas, USA) during the summer of 1998, and a total of 1636 cattle were observed to assess the relationship between breed, sex, and temperament score on the response to sudden, intermittent visual and sound stimuli, such as the ringman swinging his arm for a bid and the sound of him briefly yelling a bid. 74% of the cattle were British and European breeds (*Bos taurus*, Angus, Hereford, Charolais, Simmental and their crosses) and 21.4% were Holsteins. 93 *Bos indicus* cattle consisted of Brahman, Watusi and crosses with *Bos taurus* breeds. A 4-point temperament score was used to score each animal while it was in the ring. The scores used were (1) walks and (or) stands still, with slow, smooth body movements, (2) continuously walks or trots, and vigilant, (3) gait is faster than a trot (runs even a couple of steps), with fast, abrupt, jerky, movements, and very vigilant, and (4) hits the ring fence, walls, partitions, or people with its head. Animals were observed for flinches, startle responses, or orientation toward sudden, intermittent sounds, motions, and tactile stimulation, such as being touched with a cane or plastic paddle. Holsteins were more sound-sensitive ($P=0.02$) and touch-sensitive ($P<0.01$) than beef cattle. Sensitivity to sudden, intermittent stimuli (e.g., sound, motion, and touch) increased as temperament score (excitability) increased. Cattle with a temperament score of 1 were the least sensitive to sudden, intermittent movement and sound and those with a temperament score of 4 were the most sensitive ($P<0.01$). This same relationship was sometimes observed for touch but was not statistically significant. Motion-sensitive cattle were more likely than nonsensitive cattle to score a temperament rating of 3 or 4 ($P<0.01$). Steers and heifers were more motion-sensitive than the older bulls and cows ($P=0.03$). Beef cattle urinated ($P<0.01$,

n=1581) and defaecated ($P < 0.01$, n=1582) more often in the ring than did dairy cattle. Cattle that became agitated during handling in an auction ring were the individuals that were most likely to be startled by sudden, intermittent sounds and movements. Reactivity to sudden, intermittent stimuli may be an indicator of an excitable temperament.

Keywords: steers, heifers, bulls, cows, sex differences, British and European breeds (Bos taurus, Angus, Hereford, Charolais, Simmental and their crosses), Holsteins, Bos indicus (Brahman, Watusi and crosses), breed differences, animal behaviour, auction ring, defaecation, gait, handling, head, heifers, movement, orientation, responses, sounds, stimulation, stimuli, temperament score, urination, animal welfare, reaction time, Colorado, Texas. Copyright© 2003, CAB International

Le Neindre, P.; Boivin, X.; Trillat, G. (1996). **Reactions of Limousine cattle to handling.** [Reactions des bovins limousins lors des manipulations.] *Comptes Rendus de l'Academie d'Agriculture de France* 82(2): 71-80, ISSN: 0989-6988.

NAL Call Number: S5 C65.

Keywords: Limousine, breeds, domestication, husbandry methods, behavior, genetic variation, French language, France..

Lehr, A. (1997). **Etho-physiological reactions in mother cows and their calves during the peripartal period.** [Verhaltensphysiologische Reaktionen bei Mutterkuhen und ihren Kaelbern im peripartalen Zeitraum.] In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL: Braunschweig-Voelkenrode, Germany, pp. 138-148, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: beef cattle cows, mothers, calves, behavior, heart rate, movement, parturition, Germany, European Union, German language.

Mathew, S.R.; McCaughey, W.P.; Kennedy, A.D.; Lewis, N.J.; Crow, G.H. (1999).

Electronic monitoring of mounting behavior in beef cattle on pasture. *The Canadian Veterinary Journal* 40(11): 796-798.

NAL Call Number: 41.8 R3224.

Keywords: beef cows, monitoring, automation, sexual behavior, estrus, detection, detectors, artificial insemination, conception rate, pregnancy rate.

Matthes, H.D.; Jentsch, W.; Derno, M.; Pilz, K.; Bittner, G. (1997). **Behaviour of cattle with different adaptive states at different management systems and environmental temperatures.** [Verhalten adaptionsdifferenzierter Rinder bei unterschiedlicher Haltung und verschiedenen Umgebungstemperaturen.] In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL: Braunschweig-Voelkenrode, Germany, pp. 110-124,

Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: environmental temperature, thermoregulation, cold, heat, stress, behavior, body temperature, heart rate, rumination, movement, feed intake, rumen digestion, Germany, European Union, German language.

Meyer, B.D.; Apley, M.D.; Imerman, P.M. (2002). **Comparison of serum steroidal hormone concentrations in buller steers, riders, and uninterested penmates.**

Investigation of sickness, body weight, feed bunk status, and implant condition during buller occurrence. *Bovine Practitioner* 36 (1): 27-32, ISSN: 0524-1685.

NAL Call Number: SF779.5 A1B6.

Abstract: Live weight; rectal temperature (on days one and 3); implant condition; feed bunk condition; and serum hormone concentrations of trenbolone, trenbolone acetate, testosterone, progesterone, and estradiol 17 beta (on days one and 3) were measured in rider steers (n=17), buller steers (n=6) and control steers (n=18) at the time of bulling activity. Day one was considered the day of initial bulling activity. Liveweight at the time of bulling did not differ between groups (p=0.99), nor did rectal temperature at the time of bulling or the rectal temperature on day 3 post-bulling (p=0.93, p=0.80). There was a significant relationship between liveweight at the time of bulling activity and day one rectal temperature (p=0.002); however, the relationship between liveweight at the time of bulling and day 3 rectal temperature was not significant (p=0.31). The condition of growth hormone implants at the time of bulling did not differ between groups (p=0.27). Day one serum estradiol 17 beta concentration was significantly different between groups (p=0.05). The four steers that had detected (and quantified) levels of estradiol 17 beta on day one were riders; on the other hand, one buller and one control steer had detected (not quantified) levels of estradiol 17 beta on day one. The available data suggest that rider steers may have elevated levels of estradiol 17 beta as compared to bullers and non-involved pen mates at the time of bulling activity. Furthermore, the results of this study suggest that the rider steer should be scrutinized as closely as the buller steer in future studies.

Keywords: aggressive behavior, body temperature, bulls, estradiol, liveweight, mating behaviour, progesterone, steers, temporal variation, testosterone, trenbolone, buller steer syndrome. Copyright 2003, CAB International.

Nakanishi, Y.; Shigemori, K.; Yanagita, K.; Mieno, M.; Manda, M. (1998). **Behavioural and growth effect of oral administration of rumen protected tryptophan on weanling beef calves.** *Memoirs of the Faculty of Agriculture: Kagoshima University* 34: 89-95, ISSN: 0453-0853.

NAL Call Number: 107.6 K114.

Keywords: calves, Japanese Black, breed, oral administration, tryptophan, weaning, behavior, lying, locomotion, agonistic interactions, social behavior, vocalizations, play, growth, feed conversion efficiency, amino acids, application methods, Japan.

Nowakowski, P. (1996). **Technical and ecological considerations on mixed grazing: a review.** [Aspekty technologiczno-ekologiczne wykorzystania uzytkow zielonych przy wypasie mieszanym: przeglad literatury.] *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 291: 159-170, ISSN: 1232-3071.

Keywords: cattle, sheep, goats, pastures, feeding systems, mixed grazing, review, animal groupings, social bonds, behavior, stocking density, Polish language, Poland.

Petherick, J.C.; Holroyd, R.G.; Doogan, V.J.; Venus, B.K. (2002). **Productivity, carcass and meat quality of lot-fed *Bos indicus* cross steers grouped according to temperament.**

Australian Journal of Experimental Agriculture 42 (4): 389-398., ISSN: 0816-1089.

NAL Call Number: 23 Au792.

Keywords: steers, beef cattle, carcass quality, meat quality, performance, temperature, feedlots, liveweight, body condition, feed intake, handling, fearfulness, prediction, liveweight gain, feed conversion efficiency, dressing percentage, pH, stress.

Phillips, C. (2002). ***Cattle Behaviour and Welfare: Second Edition*** Blackwell Science: Oxford, UK, 264p., ISBN: 0-632-05645-2.

NAL Call Number: SF202.5 P45 2002.

Keywords: play behavior, social behavior, nutritional behavior, reproductive behavior, resting behavior, locomotion, adaptation, perception, cognition, selective breeding, welfare, human animal relationship, welfare, measuring welfare, welfare of dairy cows, disease, hunger, malnutrition, milking, housing, tail docking, welfare of beef cattle and draft oxen, housing, pasture, dystocia, welfare of calves, calf behavior, housing, handling, veal calves, welfare of cattle during transport, marketing, slaughter, stunning, ritual slaughter.

Phillips, C.J.C.; Johnson, P.N.; Arab, T.M. (1997). **The effect of supplementary light during winter on the growth, body composition and behaviour of steers and heifers.**

Animal Science: An International Journal of Fundamental and Applied Research 65(2): 173-181.

NAL Call Number: SF1 A56.

Keywords: steers, heifers, photoperiod, body weight, live weight gain, carcass weight, dressing percentage, feed intake, dry matter, feed conversion, body condition, conformation, blood serum, prolactin, animal behavior, sexual behavior, lean, body fat.

Price, E.O.; Adams, T.E.; Huxsoll, C.C.; Borgwardt, R.E. (2003). **Aggressive behavior is reduced in bulls actively immunized against gonadotropin-releasing hormone.** *Journal of Animal Science* 81(2): 411-5, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: The purpose of this research was to compare the frequency of aggressive behavior's in beef bulls actively immunized against gonadotropin-releasing hormone relative to contemporary nonimmunized control bulls and surgically castrated steers. Eight males were assigned to each of these treatments in each of 4 yr. Immunized males were treated with a GnRH-keyhole-limpet hemocyanin (KLH) conjugate at approximately 4 mo of age. A secondary (booster) immunization was administered at 12 mo. Steers were castrated at 4 mo of age. Animals in each treatment in each year were housed as a single group prior to testing. At approximately 16 mo of age, each group of eight animals was placed in a 10- x 16-m enclosure for 20 min on five occasions at 2 to 3 d intervals. An observer recorded butts initiated by each animal as well as participation in bouts of sparring. Relative to control bulls, immunocastration reduced the frequency of butts initiated ($P < 0.05$) and participation in sparring bouts ($P < 0.05$) to levels typically observed in steers ($P > 0.05$). These observations indicate that active immunization against GnRH reduces the incidence of aggressive behavior in male beef cattle and are consistent with our postulate that immunoneutralization of GnRH is an effective alternative to surgical castration in the management of beef cattle.

Keywords: bulls, castrations, immunocastration, alternative to surgical castration, aggressive behavior, butts.

Price, E.O.; Harris, J.E.; Borgwardt, R.E.; Sween, M.L.; Connor, J.M. (2003). **Fenceline contact of beef calves with their dams at weaning reduces the negative effects of separation on behavior and growth rate.** *Journal of Animal Science* 81(1): 116-121, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: The purpose of this study was to examine the hypothesis that fence line contact between beef calves and cows at weaning reduces indices of behavioral distress and associated temporary reductions in weight gain. One hundred Angus/Hereford-cross calves were randomly assigned to five treatments for 7 d in each of 3 yr to determine the effect of different weaning techniques on their behavior and subsequent growth. Treatments were 1) fenceline separation from dams on pasture (F-P), 2) total separation from dams on pasture (S-P), 3) total separation from dams in a drylot (corral) preconditioned to hay (S-D-P), 4) total separation from dams in a drylot not preconditioned to hay (S-D-NP), and 5) nonweaned controls on pasture (C-P). At the end of the 7-d postweaning period, all calves were placed on pasture in large groups. Calves were weighed weekly for 10 wk. In the days following weaning, F-P and C-P calves spent more time eating (grazing or eating hay) than S-P and S-D-NP calves ($P < 0.05$). The S-P calves spent more time walking (pacing) than calves in the other four treatments ($P < 0.05$), which did not differ. The S-P calves also spent less time lying down than C-P, F-P, and S-D-P calves ($P < 0.05$), S-P and S-D-NP calves did not differ in lying time. The F-P calves vocalized less than S-P and S-D-NP calves ($P < 0.05$). In general, treatment differences were greatest during the first 3 d following weaning with d 2 (20 to 30 h after weaning) showing the greatest disparity. The F-P calves spent approximately 60% of their time within 3 m of the fence separating them from their dams during the first 2 d following weaning, whereas F-P cows spent about 40% of their time within 3 m of the fence during this period. Postweaning cumulative body weight gains of the F-P calves were greater than the gains recorded for the calves in the three totally separated treatments (which did not differ). The F-P calves gained 95% more weight than the average calf in the three totally separated treatments in the first 2 wk and were still heavier at 10 wk (21.4 vs 11.0 kg, respectively, at 2 wk and 50.0 vs 38.2 kg, respectively, at 10 wk, $P < 0.05$). It was concluded that providing fenceline contact between beef calves and cows for 7 d following weaning reduces behavioral indices of distress seen in the totally separated calves. In addition, fenceline contact with dams at weaning minimizes losses in weight gain in the days following separation. Totally separated calves did not compensate for these early losses in weight gain even after 10 wk.

Keywords: beef cattle, calf, cow rearing, weaning, separation, mother young relation, behavior, weight gain, performance evaluation, experimental study. Copyright© 2003, CAB International

Prichard, W. (2000). **Cattle Handling: Leading the Way Forward** Nuffield Farming Scholarships Trust (NFST): Uckfield, UK, 31p., ISBN: 1-901801-62-4.

Keywords: handling, beef cattle, dairy cattle, USA, New Zealand, Australia, Irish Republic.

Reinhardt, V. (2002). **Artificial weaning of calves: benefits and costs.** *Journal of Applied Animal Welfare Science* 5 (3): 247-251, ISSN: 1088-8705.

NAL Call Number: QL55 H8.

Keywords: husbandry, welfare, beef cattle, calves, cost benefit analysis, weaning.

Schaffer, D.; Borell, E. von; Laube, R.B. (1999). **Cow-calf-relationships in a beef suckler cow herd. [Die Mutter-Kind-Beziehung in der Mutterkubhaltung.]** *Archiv fur Tierzucht* 42(3): 225-233, ISSN: 0003-9438.

NAL Call Number: 49 AR23.

Abstract: A beef suckler herd (25 cows, 23 calves) was observed on pasture for cow-calf behaviour. There were 20 suckling positions (with 1, 2 or 3 calves suckling per cow) during 299 sucklings. The incidence of cross-suckling and the diversity of suckling positions were higher than those in the literature, indicating that there was disruption to the bonding between the cow and its calf during calving. The cows preferred parallel lying positions along the periphery of the pasture. It is suggested that farmers should design pastures to meet animal welfare needs and that regular observation of the herd should be incorporated into the farm management scheme.

Keywords: cows, calves, animal behavior, suckler herds, maternal behaviour, bonding, suckling, beef cows, pastures, animal welfare, beef cattle, German language, Germany. Copyright© 2003, CAB International

Schmutz, S.M.; Stookey, J.M; Winkelman-Sim, D.C.; Waltz, C.S.; Plante, Y.; Buchanan, F.C. (2001). **A QTL study of cattle behavioral traits in embryo transfer families.** *The Journal of Heredity* 92(3): 290-292.

NAL Call Number: 442.8 Am3.

Abstract: Two behavioral traits, temperament and habituation, were measured in 130 calves from 17 full-sib families which comprise the Canadian Beef Cattle Reference Herd. Using variance components, heritability was calculated as 0.36 for temperament and 0.46 for habituation. Genotyping of 162 microsatellites at approximately 20 cM intervals allowed the detection of six quantitative trait loci (QTL) for behavior traits on cattle chromosomes 1, 5, 9, 11, 14, 15.

Keywords: quantitative traits, loci, heritability, genetics, husbandry, animal behavior, temperament, habituation.

Schwartzkopf-Genswein, K.S.; Stookey, J.M.; Crowe, T.G.; Genswein, B.M.A. (1998).

Comparison of image analysis, exertion force, and behavior measurements for use in the assessment of beef cattle responses to hot-iron and freeze branding. *Journal of Animal Science* 76(4): 972-979.

NAL Call Number: 49 J82.

Abstract: Thirty-three steers (328 +/- 2 kg) from a total of 300 animals were randomly selected for a comparison of techniques designed to quantify the behavioral response to painful procedures. The steers were randomly assigned to freeze-branding, (F), hot-iron branding (H), and sham branding (S) treatments. The responses of all steers were videotaped to quantify the amount and intensity of head movements during branding. In addition, the force that steers exerted on the headgate and squeeze chute during branding was recorded using strain gauges and load cells. Behaviors believed to be indicative of pain (tail-flicking, kicking, falling, and vocalizing) were also recorded during branding. These techniques were compared for their effectiveness in measuring behavioral responses of steers during branding. Hot-iron-branded steers had greater maximum and average head movement distances and velocities than F or S steers ($P < .05$), and F steers only had greater maximum values than S animals ($P < .05$). The maximum exertion forces obtained from headgate load cells were also greater in H than in F or S steers ($P < .05$); however, no differences were observed between H and F treatments for squeeze load cell or headgate strain gauge data. Hot-iron-branded steers

had the greatest incidence of tail-flicks, kicks, falls in the chute, and vocalizations, and S steers had the least. Results indicate that H steers experienced more discomfort at the time of branding than F and S steers, whereas F steers experienced more discomfort than shams. Image analysis was a superior technique for detecting treatment differences compared with exertion force measurements and frequency counts of tail-flicks, kicks, falls, and vocalization during branding.

Keywords: steers, branding, pain, responses, image processing, video recordings, forces, strain gauges, transducers, animal behavior, animal welfare.

Schwartzkopf-Genswein, K.S.; Stookey, J.M.; Passille, A.M.; de Rushen, J. (1997).

Comparison of hot-iron and freeze branding on cortisol levels and pain sensitivity in beef cattle. *Canadian Journal of Animal Science* 77(3): 369-374, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: yearling heifers, mixed breeds, Hereford, Charolais, Angus, Shorthorn, branding, pain, hydrocortisone, stress, discomfort, animal welfare, identification, hot-iron branding, freeze branding, burns.

Sederstrom, R.; Mayntz, M.; Sender, G. (2002). **Effect of afterstimulation on milk yield and fat composition in beef cattle: A form of honest begging?** *Acta Agriculturae Scandinavica Section A Animal Science* 52 (4):161-166, ISSN: 0906-4702.

NAL Call Number: S3 A27.

Keywords: Hereford, breed, blood serum fatty acids, essential fatty acids, saturated fatty acids, unsaturated fatty acids, afterstimulation, calf suckling behavior, honest begging, milk fat composition, milk yield.

Sekine, J.; Izawa, S.; Matsumoto, T.; Hai, J.; Takatori, H.; Yamasaki, Y.; Oura, R.; Hishinuma, M. (1999). **A study on changes in the blood vitamin A and cortisol levels and behavioral pattern of fattening Japanese black steers.** *Journal of the Faculty of Agriculture: Tottori University* 35: 7-13, ISSN: 0082-5360.

NAL Call Number: 107.6 T643.

Keywords: blood levels, vitamin A, retinol, glucocorticoids, adrenal cortex hormones, animal feeding, daily weight gain, behavior, stress, social behavior.

Sekine, J.; Jin, H.; Oura, R.; Hishinuma, M. (1998). **Effect of kinds of forage on feed intake and time spent for eating and rumination of Japanese black cows.** *Animal Science and Technology* 69(9): 865-869, ISSN: 0918-2365.

NAL Call Number: 49 N62.

Keywords: feed intake, hay, rice straw, crop residues, digestion, eating disorders, rumination, behavior, agricultural wastes, Japan.

Seman, D.H.; Stuedemann, J.A.; Hill, N.S. (1999). **Behavior of steers grazing monocultures and binary mixtures of alfalfa and tall fescue.** *Journal of Animal Science* 77(6): 1402-1411.

NAL Call Number: 49 J82.

Abstract: Spectral analysis was used to relate dietary quality and herbage species to the behavior of grazing steers. Four .3-ha paddocks were established with either 'AU-Triumph' tall fescue (F; *Festuca arundinacea* Schreb.), "Apollo" alfalfa (A; *Medicago sativa* L.), 1/3 fescue and 2/3 alfalfa (2/3A), or 2/3 fescue and 1/3 alfalfa (1/3A). Each paddock was stocked

with 10 to 16 steers and defoliated in 5 d. Three steers on each paddock carried vibracorders to monitor grazing time. Daily forage samples were taken in 10-cm layers and weighed. Esophageal extrusa were collected from fistulated steers to measure diet quality. Daily grazing time did not differ ($P = .37$) among treatments; however, steers grazing mixtures grazed numerically longer (1.4 h/d) than steers on monocultures. Spectral analysis revealed that steers grazing A and 2/3A had many daily meals of short duration, but steers grazing 1/3A and F consumed three meals daily at 8-h intervals. Throughout the 4.67-d grazing period, quality of the diet linearly declined in crude protein and herbage digestibility, linearly increased in neutral detergent fiber and cellulose, and exhibited quadratic changes in lignin and ash. For most quality values, the tall fescue monoculture differed from the others ($P < .05$). Steers selected diets with similar quality for the A, 2/3A, and 1/3A treatments. This study illustrates how differences in forage diets alter grazing behavior of steers.

Keywords: steers, pastures, botanical composition, selective grazing, *festuca arundinacea*, *medicago sativa*, forage, feeding frequency, duration, sward destruction, grazing intensity, stand density, rotational grazing.

Seo, T.; Sato, S.; Kosaka, K.; Sakamoto, N.; Tokumoto, K.; Katoh, K. (1998). **Development of tongue-playing in artificially reared calves: effects of offering a dummy-teat, feeding of short cut hay and housing system.** *Applied Animal Behaviour Science* 56 (1): 1-12, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: Japanese Black calves, breed, stress, plasma ACTH, hydrocortisone, corticotropin, effects, feeding, hay, housing, group versus individual, animal behaviour, weaning, exploratory behavior, abnormal behavior, grooming, displacement behavior, sucking, tongue playing, teats, dummy teat.

Shirao, D.; Sawai, T.; Fujii, K. (2000). **A study of dehorning early stage Japanese black calves and its influence on the weight gains, behavioral patterns and physiology of the calves.** *Yamaguchi Journal of Veterinary Medicine* 27: 37-42, ISSN: 0388-9335.

Keywords: beef cattle, age differences, behavior, calves, dehorning, live weight gain.

Smith, B.J.(1998). **Moving'Em: A Guide to Low Stress Animal Handling** The Graziers Hui: Kamuela, Hawaii, 352 p.

NAL Call Number: SF202.7 S65 1998

Keywords: handling, herding, driving, stockmanship, stress, history, culture, senses, perception, social behavior.

Smith, D.L.; Wilson, L.L.; Wiggers, D.L. (1998). **Electrical prod use on behavioral activities and physiological characteristics of weaned beef cattle.** *The Professional Animal Scientists* 14 (4): 243-248. Online version: <http://www.arpas.uiuc.edu/pas/pas.html>.

NAL Call Number: SF51 P76.

Keywords: chutes, cattle weighers, animal behavior, electrical stimulation, stress response, stress factors, restraint of animals, blood protein, leukocyte count, erythrocyte count, hemoglobin value, hematocrit, neutrophils, lymphocytes, ratios, conditioned reflexes, animal welfare.

Sowell, B.F.; Mosley, J.C.; Bowman, J.G.P. (1999). **Social behavior of grazing beef cattle: Implications for management.** *Journal of Animal Science* 77 (SUPPL. 1): 203, ISSN: 0021-8812.
NAL Call Number: 49 J82.

Keywords: selective culling, social behavior, management implications, social hierarchies.

Stookey, J.M.; Schwatzkopf, K.S.; Waltz, C.S.; Watts, J.M. (1997). **Effects of remote and contact weaning on behaviour and weight gain of beef calves.** *Journal of Animal Science* 75 (SUPPL. 1): 157, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: contact weaning, remote weaning, social contact, stress, weight gain.

Taylor, L.F.; Booker, C.W.; Jim, G.K.; Guichon, P.T. (1997). **Epidemiological investigation of the buller steer syndrome (riding behaviour) in a western Canadian feedlot.** *Australian Veterinary Journal* 75: 1, 45-51. ISSN: 0005-0423.

NAL Call Number: 41.8 Au72.

Abstract: To describe the buller steer syndrome in a Western Canadian feedlot. DESIGN: a retrospective study. ANIMALS: 78,445 male cattle that entered a 24,00-head feedlot in western Canada from 1991 to 1993. PROCEDURE: All cattle were given a hormonal growth promotant containing 20 mg oestradiol benzoate and 20 mg progesterone within 24 h of arrival at the feedlot. A "buller" was a steer that was observed at daily pen checking to be ridden persistently by pen mates or had evidence of having been persistently ridden by pen mates. At the completion of the feeding period, animal health records for bullers were collected and analysed. RESULTS: The prevalence of bullers in the total population was 2,139/78,445 (2.7%, range per pen 0 to 11.2%). The prevalence of bullers increased with increasing weight and age. The relapse risk after first treatment (three days in the feedlot hospital plus treatment for concurrent disease) was 30% on average (27 to 35%). Individual records from 9,734 yearling steers that entered the feedlot in 1991 and 1992 showed that bullers were significantly ($P < 0.05$) heavier at processing than non-bullers. Bullers occurred as a point source epidemic with a cause occurring soon after cattle arrived at the feedlot and were mingled into pen groups. This gave a "days on feed" distribution. The peak incidence of bullers occurred much sooner after arrival and dropped off much quicker in older cattle. The daily incidence of bullers was temporal, but was not related to season of the year, weather condition of any other feedlot management practice. It was related to the seasonal arrival of cattle at the feedlot, their age at entry to the feedlot and the post arrival occurrence of bullers. Reimplantation with hormonal growth promotants and castration of intact bulls did not produce an epidemic of bullers. CONCLUSIONS: The findings of this study support the theory that bullers are the result of agonistic interactions, which occur concurrent with the establishment and maintenance of a social hierarchy with pens of feedlot cattle.

Keywords: bulls, bullers, epidemiology, progesterone, growth promoters, animal behavior, feedlots, weight, age, body weight, Alberta, Canada.

Taylor, L.F.; Booker, C.W.; Jim, G.K.; Guichon, P.T. (1997). **Sickness, mortality and the buller steer syndrome in a western Canadian feedlot.** *Australian Veterinary Journal* 75 (10) 732-736, ISSN: 0005-0423,

NAL Call Number: 41.8 Au72.

Abstract: Medical records of 78 445 male cattle that entered a 24 000-head feedlot in Alberta, Canada, between August 1991 and November 1993 were reviewed. The prevalence of dominance behaviour increased with increasing age of cattle on arrival at the feedlot.

Sickness and mortality decreased with increasing age on arrival but increased in cattle exposed to aggressive bulls. Sickness and dominance behaviour mostly occurred within the first 30 days of the feeding period. Pens of cattle with a high prevalence of bullers did not have a correspondingly high prevalence of sickness or mortality. It is suggested that dominance behaviour is correlated with sickness in feedlot steers.

Keywords: age, buller-steer-syndrome, dominance, behavior, feedlot, mortality, sickness, Western Canada. Copyright© 2003, CAB International

Turner, L.W.; Udal, M.C.; Larson, B.T.; Shearer, S.A. (2000). **Monitoring cattle behavior and pasture use with GPS and GIS.** *Canadian Journal of Animal Science* 80(3): 405-413. **NAL Call Number:** 41.8 C163.

Keywords: grazing, monitoring, global positioning systems, geographical information systems, tracking, grassland management, pastures and range.

Udal, M.C.; Turner, L.W.; Larson, B.L.; Shearer, S.A. (1998). **GPS tracking of cattle on pasture.** In: *ASAE Annual International Meeting, Orlando, Florida, USA, 12-16 July, 1998*, ASAE Paper no. 983134, American Society of Agricultural Engineers (ASAE): St Joseph, USA, 13p.

Keywords: animal behavior, monitoring, geographical information systems, intensively managed beef cattle, time spent in pasture segments, time spent watering.

Viljoen, S. (2001). **The ABC of beef production - 2. Pecking orders in cow herds.** *Farmer's Weekly* 91002: 28-30.

NAL Call Number: 24 F225.

Keywords: cows, social behavior, social structure, South Africa.

Viljoen, S. (2000). **ABC of beef production - 1. Cattle psychology.** *Farmer's Weekly* 90051: 16-17.

NAL Call Number: 24 F225.

Keywords: psychological factors, mental ability, South Africa.

Voisinet, B.D.; Grandin, T.; Tatum, J.D.; O'Connor, S.F.; Struthers, J.J. (1997). **Feedlot cattle with calm temperaments have higher average daily gains than cattle with excitable temperaments.** *Journal of Animal Science* 75 (4): 892-896, ISSN: 0021-8812. **NAL Call Number:** 49 J82.

Keywords: steers, heifers, Braford, Simmental x Red Angus, Red Brangus, Simbrah, American Angus (AA), Tarentaise x AA. breeds, breed differences, sex differences, temperament, weight gain, handling, tameness, behavior, growth rate.

Watts, J.M.; Stookey, J. M.; Schmutz, S.M.; Waltz, C.S. (2001). **Variability in vocal and behavioural responses to visual isolation between full-sibling families of beef calves.** *Applied Animal Behaviour Science* 70(4): 255-273, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: calves, bulls, heifers, age differences, sex differences, vocalization, environmental factors, genetic effects, isolation, live weight, animal behaviour, individual variability, Canada.

Watts, J.M.; Stookey, J.M. (1999). **Effects of restraint and branding on rates and acoustic parameters of vocalization in beef cattle.** *Applied Animal Behaviour Science* 62(2/3): 125-135. ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Abstract: 189 calves were randomly assigned to 4 treatments in a 2 x 2 factorial design, the factors were branded and not branded, and restrained and not restrained. On 4 consecutive days calves were brought through a headgate and squeeze apparatus. Restrained calves were caught in the headgate for 3 to 5 s. The remainder were stopped at the headgate but not restrained. On day 5, all calves were captured and restrained. Half the animals were hot-iron branded and half were sham branded using an unheated iron. During branding, vocalizations were recorded. Digitized files were used to generate an audio-spectrogram and a power spectrum for each call. 167 calls were analysed. During treatment, 65 calves vocalized. Significantly more branded than non-branded animals vocalized (58/95 compared with 7/94). Branded animals showed a greater frequency range in the fundamental, or lowest harmonic, of the audio-spectrogram, (68.04 plus or minus 5.33 Hz compared with 28 plus or minus 8.74 Hz), a higher maximum frequency (186.66 plus or minus 5.19 Hz compared with 141.6 plus or minus 6.6 Hz) and a higher peak sound level. The previous 4 days of restraint did not alter the probability of vocalizing, or any characteristics of the calls. It is suggested that measuring vocal response may be particularly useful when the effects of relatively severe stressors are being investigated.

Keywords: calves, stress, branding, beef cattle, measurement, vocalization, animal welfare, behavior. Copyright© 2003, CAB International

Waynert, D.F.; Stookey, J.M.; Schwartzkopf-Genswein, K.S.; Watts, J.M.; Waltz, C.S. (1999). **The response of beef cattle to noise during handling.** *Applied Animal Behaviour Science* 62(1): 27-42. ISSN: 0168-1591.

NAL Call Number: QL750 A6 .

Keywords: heifers, electronic scale, remote telemetry, heart rate, fearfulness, stress, handling, noise, animal behavior, movement, sounds, humans shouting, metal clanging, habituation.

Wettemann, R.P.; Lehman, F. (1997). **Buller steers: causes and control.** *Research Report* 957: 123-128.

NAL Call Number: 100 OK4M.

Keywords: behavior, reproduction, implants.

White, D. H.; Gazzola, C.; Jeffery, M. R.; Reid, D. A. (2000). **The effect of post-pubertal castration on behaviour in beef cattle.** *Asian-Australasian Journal of Animal Sciences* 13 (Supplement): 145, ISSN: 1011-2367.

Keywords: beef cattle, castration, behavior, puberty, growth rate.

Wilson, S.C.; Mitlohner, F.M.; Morrow-Tesch, J.; Dailey, J.W.; McGlone, J.J. (2002). **An assessment of several potential enrichment devices for feedlot cattle.** *Applied Animal Behaviour Science* 76 (4): 259-265, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: beef cattle, Charolais, feedlots, enrichment, animal behavior, animal welfare, aroma, stimulation, animal preferences, habituation, environmental enrichment, scratching devices.

Wilson, S.C.; Fell, L.R.; Collins, D.P. (1999). **The development of indices of welfare for beef cattle in feedlots.** *Journal of Animal Science* 77 (SUPPL. 1): 148, ISSN: 0021-8812. NAL Call Number: 49 J82.

Keywords: feedlot cattle, behavior, production, welfare status, indices.

Zerbe, F. (1997). **Behavioural studies of rhythmic activities in gravid Galloway-cows using telemetric technique (Ethosys).** [Untersuchung rhythmischer Verhaltensaktivitaeten bei Galloway-Rindern mit Hilfe telemetrischer Technik (Ethosys).] In: 3. Trenthorster Kolloquium, *Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.]* FAL: Braunschweig-Voelkenrode, Germany, pp. 172-183, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723. NAL Call Number: 18 L2353 Suppl.

Keywords: cows, mothers, parturition, movement, behavior, sensors, measuring instruments, reproduction, Germany, European Union, German language.

Breeding

Adamski, M. (2000). **Problems rearing the calves of beef cattle and theirs crosses with BW and RW in extensive management [Problematyka odchowu cielat ras miesnych i ich mieszanow z rasami cb i czb w warunkach ekstensywnych.]** *Annals of Warsaw Agricultural University. Animal Science* 35(Suppl.): 49-54, ISSN: 0208-5739.

Keywords: beef calves, introduced breeds, crossbreeding, extensive husbandry, pastoralism, pasture raised, no farm buildings, gestation, parturition, calving ease, body weight gain, Polish language, Poland.

Amer, P.R.; Simm, G.; Keane, M.G.; Diskin, M.G.; Wickham, B.W. (2001). **Breeding objectives for beef cattle in Ireland.** *Livestock Production Science* 67(3): 223-239, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: breeding, economics, calf growth, calf quality, calving ease, economic values, gestation length, selection sub, indexes, slaughtered progeny, Ireland.

Arango, J.A.; Cundiff, L.V.; Van Vleck, L.D. (2002). **Breed comparisons of Angus, Brahman, Hereford, Pinzgauer, Sahiwal, and Tarentaise for weight, weight adjusted for condition score, height, and body condition score.** *Journal of Animal Science* 80 (12):3142-3149, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Angus, Brahman, Hereford, Pinzgauer, Sahiwal, Tarentaise, growth, height, body condition scores, breeding, environmental effects, mixed models.

Arango, J.A.; Cundiff, L.V.; Van Vleck, L.D. (2002). **Genetic parameters for weight, weight adjusted for body condition score, height, and body condition score in beef cows.** *Journal of Animal Science* 80 (12): 3112-3122, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breed, Angus, Hereford, dams, heights, weights, adjustments, genetic parameters, body condition scores, genetics, environmental effects, genetic correlations, analysis, heritability, lactation, pregnancies.

Archer, J.A.; Bergh, L. (2000). **Duration of performance tests for growth rate, feed intake and feed efficiency in four biological types of beef cattle.** *Livestock Production Science* 65 (1, 2): 47-55, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: young beef bulls, breed, Afrikaner, Angus, Bonsmara, Hereford, Sanga, Simmental, feed intake, growth rate, feed efficiency.

Archer, J.A.; Richardson, E.C.; Herd, R.M.; Arthur, P.F. (1999). **Potential for selection to improve efficiency of feed use in beef cattle: A review.** *Australian Journal of Agricultural Research* 50 (2): 147-161, ISSN: 0004-9409.

NAL Call Number: 23 Au783.

Keywords: growing cattle, mature cattle, genetic variation, feed efficiency, selection programs, requirements for maintenance, body composition, proportions of visceral organs, level of physical activity, digestion efficiency, literature review.

Arthur, P.F.; Archer, J.A.; Melville, G.J. (2000). **Factors influencing dystocia and prediction of dystocia in Angus heifers selected for yearling growth rate.** *Australian Journal of Agricultural Research* 51 (1): 147-153, ISSN: 0004-9409.

NAL Call Number: 23 Au783.

Keywords: Angus, heifers, selection, yearling growth rate, dystocia, calf birth weight, calf survival.

Barth, A.D.; Waldner, C.L. (2002). **Factors affecting breeding soundness classification of beef bulls examined at the Western College of Veterinary Medicine.** *Canadian Veterinary Journal* 43 (4): 274-284, ISSN: 0008-5286.

NAL Call Number: 41.8 R3224.

Keywords: beef cattle, bulls, reproductive efficiency, reproductive performance, seasonal variation, semen quality, spermatozoa, scrotal circumference, lameness, scrotal frostbite, body condition, Saskatchewan, Canada.

Bochkov, V.N. (1998). *Economic and Biological Special Features of Simmenthal and Anhus Breeds of Foreign Breeding under Conditions of the Forest-steppe of Ukraine. [Khozyaystvenno-biologicheskkiye Osobennosti Simmental'skoy I Angusskoy Porod Zarubezhnoy Selektzii V Usloviyakh Lesostepi Ukrainy.]* Institute of Animal Breeding and Genetics: Chubyn'ske, Kyiv region (Ukraine), 175 p.

Keywords: Simmenthal, Angus, breeds, genetic factors, meat production, meat yield, animal performance, animal production, national program goals, thesis, Ukraine, forest steppe, Ukrainian Language.

Bourdon, R.M. (1998). **Shortcomings of current genetic evaluation systems.** *Journal of Animal Science* 76 (9): 2308-2323, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cattle industry, sheep industry, breeding, economic selection indexes, multiple trait selection, genetic evaluation systems, genetic predictions.

Brown, M.A.; Brown, A.H. Jr.; Jackson, W.G.; Miesner, J. R. (2001). **Genotype X Environment Interactions in Milk Yield and Quality in Angus, Brahman, and Reciprocal Cross Cows on Different Forage Systems.** *Journal of Animal Science* 79 (7): 1643-1649. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Milk yield and quality were observed on 93 Angus, Brahman, and reciprocal cross cows over 3 yr to evaluate the interactions of direct and maternal breed effects and heterosis with forage environment. Forage environments were common bermudagrass (BG), endophyte infected tall fescue (E+), and a rotational system (ROT) of both forages, in which each forage (BG or E+) was grazed during its appropriate season, usually June through October for BG and November through May for E+. Milk yield was estimated each of 6 mo (April through September) via milking machine and converted to a 24 h basis. Milk fat, milk protein, and somatic cell count were analyzed by a commercial laboratory. Heterosis for milk yield was similar among forages, averaging 2.4 kg ($P < 0.01$). Expressed as percentages of purebred means, heterosis for milk yield was largest on E+ (52.8%), intermediate on ROT (39.3%), and smallest on BG (23.7%). Direct breed effects for milk yield favored Brahman, and they were similar among forages but tended to be larger for E+ (2.5 kg) and ROT (2.8 kg) than for BG (1.3 kg). Direct breed effects for milk fat favored Brahman and were similar among forages but tended to be larger for E+ (1.0%) and ROT (1.0%) than for BG (0.6%). Purebred cows exceeded crossbreds in milk protein by 0.1% on ROT ($P < 0.10$). Crossbred cows had lower somatic cell counts than purebreds on BG ($P < 0.05$), E+ ($P < 0.01$), or ROT ($P > 0.30$).

Heterosis for somatic cell counts as percentages of purebred means was similar for BG (68.3%) and E+ (68.9%) and less favorable for ROT (31.6%). Maternal breed effects for somatic cell count favored Angus on ROT ($P < 0.10$) with a similar nonsignificant trend on BG and E+. Direct breed effects for somatic cell count favored Brahman on ROT ($P < 0.10$) with similar nonsignificant trends on BG and E+. These results suggested that a rotation of cows from E+ to BG in the summer can partially alleviate negative effects of E+ on milk yield. Conclusions also indicated an advantage to crossbred cows in somatic cell count and provided evidence of both direct and maternal breed effects for this trait. The results also suggested that direct breed effects for milk yield, milk fat, and somatic cell count and heterosis for milk yield and somatic cell count (as percentages of purebred means) tended to vary with forage environment, indicating a potential for genotype X environment interaction for these traits.

Burrow, H.M. (2001). **Variances and covariances between productive and adaptive traits and temperament in a composite breed of tropical beef cattle.** *Livestock Production Science* 70 (3): 213-233, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: beef breeds adapted to tropics, adaptive traits, covariances, variances, population genetic statistics, fertility, growth weight gain, repeated tick, worm egg and buffalo fly counts, rectal temperatures, measure of heat resistance, temperment, flight speed scores, scrotal circumference.

Burrow, H.M.; Corbet, N.J. (2000). **Genetic and environmental factors affecting temperament of zebu and zebu, derived beef cattle grazed at pasture in the tropics.** *Australian Journal of Agricultural Research* 51 (1): 155, 162. ISSN: 0004-9409.

NAL Call Number: 23 Au783.

Keywords: Zebu, breed, steers, heifers, bull calves, genetics, environmental effects, temperament, behavior, flight speed, genetic factors, selection, tropical pasture grazing, Australia.

Burrow, H.M. (1997). **Measurements of temperament and their relationships with performance traits of beef cattle.** *Animal Breeding Abstracts* 65 (7): 477-495, ISSN: 0003-3499.

NAL Call Number: 241 IM72RA.

Keywords: beef breeds, breed differences, temperament, standardized scoring system, relationships, performance, traits, evaluation, meat quality, behavior, heritability, breeding, growth, milk yield, carcasses, disease resistance, reviews.

Cardoso F.F.; Cardellino, R.A.; Campos, L.T. (2001). **Environmental factors that affect the performance from birth to weaning of Angus calves raised in the state of Rio Grande do Sul - Brazil.** [Fatores Ambientais que Afetam o Desempenho do Nascimento a Desmama de Bezerros Angus Criados no Rio Grande do Sul.] *Revista Brasileira de Zootecnia* 30(2): 318-325.

NAL Call Number: SF1 R45.

Keywords: breed, Angus, effects of age of dam, sex, age of calf, month of birth, environmental factor effects, visual evaluation scores, weaning conformation scores, precocity, muscling, size, Beef Cattle Improvement data, Brazil, Portuguese language.

Casasus, I.; Ferrer, R.; Sanz, A.; Villalba, D.; Revilla, R. (2000). **Performance and ingestive activity of brown swiss and pirenaica cows and their calves during the spring on valley meadows.** [Rendimientos y actividad ingestiva de vacas de raza parda alpina y pirenaica

y sus terneros en pastoreo de praderas de fondo de valle durante la primavera.]

Archivos de Zootecnia 49(188): 445-456, ISSN: 0004-0592.

Keywords: breed, Brown Swiss, Pirenaica, cows, spring-calving, calves, indoor housing, lactation, natural pastures, energy requirements, grazing behavior, calf performance, milk intake, growth rate, cow milk yield.

Cebra, C.K.; Cebra, M.L.; Ikede, B.O. (1999). **Congenital joint laxity and disproportionate dwarfism in a herd of beef cattle.** *Journal of the American Veterinary Association* 215(4):519-21, 483.

NAL Call Number: 41.8 Am3.

Keywords: congenital disease, disproportionate dwarfism, excessive extension of metacarpophalangeal and metatarsophalangeal joints, calf survival, radiographic evaluation, carpal and tarsal bones, chondrodystrophy, cause, feeding of dry, spoiled silage.

Chambaz, A.; Kreuzer, M.; Scheeder, M.R.L.; Dufey, P.A. (2001). **Characteristics of steers of six beef breeds fattened from eight months of age and slaughtered at a target level of intramuscular fat: II. Meat quality.** *Archiv fuer Tierzucht* 44 (5): 473-488, ISSN: 0003-9438.

NAL Call Number: 49 AR23.

Keywords: Angus, Simmental, Charolais, Limousin, Blonde d'Aquitaine, Piedmontese steers, breed differences, forage-based diet, 3.5% intramuscular fat (IMF), ultrasound assessments, housing, tie stall barn, loose housing, straw bedding. M. biceps femoris, M. longissimus dorsi, M. regio glutea, muscular system, collagen solubility, heme iron, intramuscular fat, meat quality, pH, shear force, tie-barn stall.

Choroszy, B.; Choroszy, Z. (1998). **Simmental cattle breeding in Poland: History and prospects.** *Biuletyn Informacyjny Instytut Zootechniki* 36(3): 5-11, ISSN: 0209-2492.

NAL Call Number: SF1 K7.

Keywords: Simmental, dual, purpose breed, breeding programs, dairy and meat traits, high quality beef, milk production, Poland, Polish language.

Crews, D.H. Jr.; Kemp, R.A. (2002). **Genetic evaluation of carcass yield using ultrasound measures on young replacement beef cattle.** *Journal of Animal Science* 80 (7): 1809-1818, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: replacement beef animal, genetic evaluation, analytical method, ultrasound analytical method, breeding values, carcass traits, carcass yield.

Crump, R.E.; Simm, G.; Nicholson, D.; Findlay, R.H.; Bryan, J.G.E.; Thompson, R. (1997). **Results of multivariate individual animal model genetic evaluations of British pedigree beef cattle.** *Animal Science: An International Journal of Fundamental and Applied Research* 65 (2): 199-207, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Keywords: Aberdeen Angus, Charolais, Limousin, Simmental, South Devon, breed, best linear unbiased predictions, breeding value, genetic evaluation, effects of, group, sex, month of birth, birth type (single or multiple), embryo transfer births, fostered calves, breed of dam, proportion purebred, age of dam, live weight, United Kingdom.

Dadi, H.; Schoeman, S.J.; Jordaan, G.F.; van der Westhuizen, J. (2002). **The influence of Charolais and Angus breeding levels on pre-weaning growth performance traits in**

crossbred calves. *South African Journal of Animal Science* 32 (3): 201-207, ISSN: 0375-1589.

NAL Call Number: SF1.S6

Keywords: beef, breed, Charolais x Angus, calf, birth weight, direct breeding values, heritability, maternal breeding values, pre-weaning average daily gain, pre-weaning, growth performance traits, weaning weight.

Dal-Farra, R.A.; Roso, V.M.; Schenkel, F.S. (2002). **Environmental effects and heterosis on weight gain from birth to weaning and on visual scores at weaning of beef cattle.** [Efeitos de Ambiente e de Heterose sobre o Ganho de Peso do Nascimento ao Desmame e sobre os Escores Visuais ao Desmame de Bovinos de Corte.] *Revista Brasileira de Zootecnia* 31 (3 Supplement):1350-1361, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: breed, Nellore x Angus, Nellore x Hereford, calf age, calf birth date, conformation, dam age, environmental effects, heterosis, individual, maternal, muscling, precocity, visual score at weaning, weight gain, birth to weaning.

de Oliveira, A.R.G.; da Silva, L.O.C.; Euclides, F.K.; de Figueiredo, G.R. (1999).

Dissemination of genetic improvement in beef cattle. *Revista Brasileira de Zootecnia* 28 (6): 1219-1225.

NAL Call Number: SF1 R45.

Keywords: breeding, genetic dissemination, genetic improvement, genetic lag, theoretical models, Portuguese language.

De Mattos, D.; Bertrand, J.K.; Herring, W.O.; Benyshek, L.L. (1996). **Sire and maternal grandsire by environment interactions for weaning weight in a Hereford beef cattle population in Uruguay.** *Journal of Animal Science* 74 (SUPPL. 1): 106, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: environmental interaction, genetics, grandsire, male, sire, weaning weight, Brazil.

Dodenhoff, J.; Wilson, D.E. (1999). **Comparison of models to estimate genetic effects for weaning weight of Angus cattle.** *Journal of Animal Science* 77(12): 3176-3184.

NAL Call Number: 49 J82 .

Keywords: weaning weight, geographical variation, genotype environment interaction, dams (mothers), age at weaning, maternal effects, beef herds, animal husbandry, sex differences, phenotypes, maternal behavior, simulation models, growth models, heritability, estimation, genetic correlation.

Dodenhoff, J.; Van Vleck, L.D.; Gregory, K.E. (1999). **Estimation of direct, maternal, and grandmaternal genetic effects for weaning weight in several breeds of beef cattle.** *Journal of Animal Science* 77 (4): 840-845, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breed, Braunvieh x Charolais x Limousin x Angus x Hereford, Gelbvieh x Simmental x Angus x Hereford, breed, Pinzgauer x Red Poll x Angus x Hereford, direct genetic effects, direct heritability estimates, grandmaternal genetic effects, maternal genetic effects, weaning weight.

Fernandes, H.D.; Ferreira, G.B. (2000). **Comparative study of seven different statistical models for weight gain in beef cattle.** [Estudo Comparativo de Sete Diferentes Modelos Estatísticos para a Característica Ganho de Peso em Bovinos de Corte.] *Revista Brasileira de Zootecnia* 29(5): 1340-1348.

NAL Call Number: SF1 R45.

Keywords: breed, Charolais, mathematical model, sire model, statistical weight gain model, maternal effect, permanent environmental effects, Portuguese language.

Fordyce, G.; Howitt, C.J.; Holroyd, R.G.; O'Rourke, P.K.; Entwistle, K.W. (1996). **The performance of Brahman-Shorthorn and Sahiwal-Shorthorn beef cattle in the dry tropics of northern Queensland. 5. Scrotal circumference, temperament, ectoparasite resistance, and the genetics of growth and other traits in bulls.** *Australian Journal of Experimental Agriculture* 36 (1): 9-17, ISSN: 0816-1089.

NAL Call Number: 23 Au792.

Keywords: beef cattle breeds, bulls, crossbreeding, Brahman, Sahiwal, Shorthorn, performance, tropics, temperament, behavior, flight distance, tick and buffalo fly resistance, genetics, growth, traits, disease resistance, ectoparasites, scrotum, dimensions, genetic parameters,, heritability, genetic correlation, Australia.

Fouilloux, M.; Noelle, R.G.; Gaillard, J.; Menissier, F. (2000). **Genetic correlation estimations between artificial insemination sire performances and their progeny beef traits both measured in test stations.** *Genetics Selection Evolution (Paris)* 32(5): 483-499, ISSN: 0999-193X.

NAL Call Number: QH431 A1A52.

Keywords: bulls, sire performance testing, artificial insemination, carcass composition, carcass fatness score, diet, genetic correlation, progeny beef traits, progeny dressing percentage, progeny growth, progeny skeletal frames, sire muscling scores, France.

Franke, D.E. (1999). **Mixed model estimates of genetic effects for beef cattle birth and weaning traits.** *Journal of Animal Science* 77 (SUPPL. 1): 139, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef calves, birth traits, genetic effects, mixed model estimates, body weight, growth, performance, weaning traits, genetic effects, mixed model estimates.

Frisch, J.E.; O'Neill, C.J. (1998). **Comparative evaluation on beef cattle breeds of African, European and Indian origins. 1. Live weights and heterosis at birth, weaning and 18 months.** *Animal Science: An International Journal of Fundamental and Applied Research* 67 (1): 27-38, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Keywords: Belmont Adaptaur, Belmont BX, Belmont Red, Boran, Brahman, Charolais, Tuli, breed differences, crossbreeding, growth rate, heterosis, live weight, Australia.

Frisch, J.E.; O'Neill, C.J. (1998). **Comparative evaluation of beef cattle breeds of African, European and Indian origins. 2. Resistance to cattle ticks and gastrointestinal nematodes.** *Animal Science: An International Journal of Fundamental and Applied Research* 67 (1): 39-48, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Keywords: Belmont Adaptaur, Belmont BX, Belmont Red, Boran, Brahman, Charolais, Tuli, breed differences, host, cattle tick, Acarina, pest, nematode, parasite, gastrointestinal nematode infestation, parasitic disease, breed difference, crossbreeding, heterosis, live weight gain, Australia.

Gaughan, J.B.; Mader, T.L.; Holt, S.M.; Josey, M.J.; Rowan, K.J. (1999). **Heat tolerance of Boran and Tuli crossbred steers.** *Journal of Animal Science* 77(9): 2398-2405. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Experiments were conducted to evaluate the heat tolerance of the following breeds: Hereford (H), Brahman (B), H x B, H x Boran (H x Bo) and H x Tuli (H x T). Heat tolerance was evaluated in a climatically controlled room (Exp. 1) and under summer environmental conditions (Exp. 2) by comparing rectal temperatures (RT), respiration rates (RR), and sweating rates (SW). In Exp. 1, under extremely hot conditions (mean temperature-humidity index [THI] > 90), purebred B had significantly ($P < .05$) lower RT and RR than other genotypes, which may be indicative of greater surface area per mass to dissipate heat and a lower metabolic rate than other genotypes. Boran and Tuli crosses had RT (39.5 degrees C) that were intermediate to those of B (39.0 degrees C) and H x B (40.0 degrees C). The H genotype had the greatest RT at 40.3 degrees C. Among the breeds, trends in RR were similar to RR observed at THI < 77; B had the lowest RR, and H x B were intermediate. However, in these extreme conditions, RR did not differ among the purebred Hand the Boran and Tuli crossbred steers, but H x B steers had lower RR than the other H crossbred steers. Sweating rates were significantly greater for the *Bos indicus* x *Bos taurus* crosses (H x B and H x Bo) than for the purebred genotypes (H x B) and the *Bos taurus* cross (H x T). In Exp. 2, mean RT for B, H x B, H x B, H x Bo, and H x T were very similar to those recorded under the moderate heat stress conditions found in Exp. 1. There were no differences in RT among B, H x Bo, and H x T genotypes. The RR increased over time for H only, and RR for other genotypes tended to be elevated only slightly over time. Among genotypes, SW was significantly greater for the H x Bo steers. The ability of the *Bos indicus* crosses to dissipate heat though enhanced SW and associated evaporative cooling was evident. However, the heat-tolerant nature of the *Bos taurus* cross (H x T) was not evident through enhanced RR or SW in either experiment. Compared with other genotypes, the lower RR of B steers was clearly evident and is assumed to be due to greater surface area and other skin characteristics that allow them to dissipate heat to maintain lower RT. These data suggest that the H x Bo and H x T are similar to H x B and intermediate to H and B genotypes in maintaining homeostasis when exposed to a high heat load.

Keywords: heat tolerance, crossbreeding, Brahman, Boran, Tuli, Hereford, environmental temperature, insolation, relative humidity, wind, body temperature, respiration rate, sweating.

Gauly, M.; Mathiak, H.; Kraus, M.; Hoffmann, K.; Erhardt, G. (2001). **Difference in temperament of beef cattle regarding breed and sex. [Rasse- und Geschlechtsunterschiede im Temperament von Kalbern in Mutterkuhhaltung.]**

Deutsche Tierärztliche Wochenschrift 108(5): 206-210, ISSN: 0341-6593.

NAL Call Number: 41.8 D482.

Keywords: calves, cows, bulls, Aberdeen-Angus, German Simmental, breed differences, sex differences, behavior, temperament, handling, German language.

Goonewardene, L.A. Pang, H. Berg, R.T. Price, M.A. (1999). **A comparison of reproductive and growth traits of horned and polled cattle in three synthetic beef lines.** *Canadian Journal of Animal Science* 79(2): 123-127.

NAL Call Number: 41.8 C163.

Abstract: The data for the study were obtained over an 11-yr period and the number of observations varied from 2663 to 4263 depending on the trait that was studied. The objective was to compare the reproduction and growth traits of genetically horned and polled cattle in three synthetic lines of beef cattle. No differences ($P > 0.05$) were observed between horned and polled cattle in all lines for pregnancy, calving and weaning rates, calf birth and weaning weights, calf preweaning average daily gains, dystocia score, cow weights and cow condition scores at calf birth and calf weaning. We advocate the use of polled cattle for breeding, which is a welfare friendly alternative and circumvents the need for dehorning.

Keywords: horns, polled condition, reproductive traits, growth, traits, lines, reproductive performance, body weight, live weight, body condition.

Goonewardene, L.A.; Hand, R.K.; Wang, Z.; Al-Ani, L.; Carlyon, R.; Yang, R.C. (2000). **The occurrence and genetics of sand cracks in beef cattle.** *Canadian Journal of Animal Science* 80(4): 767-768, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: beef, Angus x Hereford, Hereford, Red Angus, Shorthorn, foot health, sand cracks, heritability, prevalence, severity.

Goyache, F.; del Coz, J.J.; Quevedo, J.R.; Lopez, S.; Alonso, J.; Ranilla, J.; Luaces, O.; Alvarez, I.; Bahamonde, A. (2001). **Using artificial intelligence to design and implement a morphological assessment system in beef cattle.** *Animal Science: An International Journal of Fundamental and Applied Research* 73 (1): 49-60, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Keywords: linear morphological system, algorithms, mathematical method, morphological assessment system, assessment method, anatomical traits, artificial intelligence, complex genetic traits, type traits.

Graham, J.F.; Clark, A.J.; Hayes, G.J.; Kearney, G.A.; Deland, M.P.B. (2000). **The effect of genotype on growth and fatness when Angus, Hereford, Limousin and Simmental sires are mated to Angus and Hereford cows.** *Asian, Australasian Journal of Animal Sciences* 13 (Supplement Vol. C): 325-328, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: breed, Angus, Hereford, Limousin, breed, Simmental, calf, cow, crossbred, dam, female, male, sire, semen, artificial insemination, breeding method, ultrasound, calving, eye, muscle area, fatness, genotype, growth, estimated breeding values.

Gray, S.L.; Thompson, C.E.; Henricks, D.M.; Bridges, W.C.; Skelley, G.C.; Worrell, M.A. (1998). **Genetic predisposition to heat stress in beef cattle caused by grazing endophyte, infected fescue.** *Journal of Dairy Science* 81(SUPPL. 1): 83, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: heat stress, genetic predisposition, cortisol, level, prolactin, level.

Grzybowski, G. (2002). **Genetic defects in cattle and their economic significance.**

[**Mutacje genomu bydła oraz ich znaczenie gospodarcze.**] *Biuletyn Informacyjny Instytut Zootechniki* 40 (2):59-74, ISSN: 0209-2492.

NAL Call Number: SF1 K7.

Abstract: Modern cattle population has originated from relatively small gene pools. Therefore, in comparison with the human population, it is likely that fewer genetic defects will occur in cattle, but those that do will be at a relatively high prevalence. Because breeds of cattle developed in isolation (similar to human ethnic groups), many recessive defects are breed-specific. Therefore, it would be imprudent to suspect that the majority of defects existing in cattle have been recognised. Caution is required when reducing the risk of dissemination of recessive defects resulting from increased selection pressure within the dairy industry presently dominated by Holstein-Friesians. Where commercial production is dominated by purebreds, the risk of dissemination of recessive defects is real. A variety of autosomal recessive defects, many lethal to the newborn calf, have been recognised in the HF breed. The most significant is BLAD (bovine leukocyte adhesion deficiency) and DUMPS (deficiency of uridine monophosphate syntase). In 2000, complex vertebral malformation (CVM) - a new recessively inherited genetic defect was discovered in HF cattle. Animals

determined to be carriers will be identified with code CV and those determined not to be carriers as TV. It is obvious that CVM will be a worldwide problem in Holsteins just as BLAD was a few years ago. The CVM disorder causes a multitude of possible abnormalities, some with visible deformities. Embryonic deaths and abortions due to CVM may happen at any time during gestation. Many CVM calves or fetuses will be lost earlier in the gestation period, and such occurrence will rarely be detected (besides, abortion and stillbirths can occur for reason other than CVM). At present, the molecular test for identifying carriers of the CVM defect is based on genetic markers that are inherited together with the disease gene. In beef cattle, the nt821 (del11) mutation in the myostatin gene, responsible for the occurrence of muscle hypertrophy in Belgian Blue cattle, seems the most significant. The syndrome is associated with some production problems such as reduced fertility, dystocia and reduced calf survival. For commercial production it is recommended that the breeding female herd be kept free from double muscling.

Keywords: breed, Friesian, Holstein, Belgian Blue, bovine leukocyte adhesion deficiency, immune system disease, complex vertebral malformation, bone disease, deficiency of uridine monophosphate synthase, endocrine disease, muscle hypertrophy, economic significance, embryonic deaths, genetic defects, gestation periods, Polish language. Copyright© 2003, CAB International

Gutierrez, J.P.; Alvarez, I.; Fernandez, I.; Royo, L.J.; Diez, J., Goyache, F. (2002). **Genetic relationships between calving date, calving interval, age at first calving and type traits in beef cattle.** *Livestock Production Science* 78 (3): 215-222, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: calving date, calving interval, genetic correlation, heritability, reproductive performance, type traits.

Hammond, A.C.; Olson, T.A.; Chase, C.C. Jr.; Bowers, E.J.; Randel, R.D.; Murphy, C.N.; Vogt, D.W.; Tewolde, A. (1996). **Heat tolerance in two tropically adapted Bos taurus breeds, Senepol and Romosinuano, compared with Brahman, Angus, and Hereford cattle in Florida.** *Journal of Animal Science* 74(2): 295-303. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Two trials were conducted with heifers to determine heat tolerance among temperate Bos taurus (Angus, Hereford), Bos indicus (Brahman), tropical Bos taurus (Senepol, Romosinuano), and the reciprocal crosses of Hereford and Senepol. Differences among breeds in temperament score, circulating concentrations of cortisol, and blood packed cell volume were also investigated. Trial 1 used 43 Angus, 28 Brahman, 12 Hereford, 23 Romosinuano, 16 Senepol, 6 Hereford X Senepol (H X S), and 5 Senepol X Hereford (S X H) heifers. Trial 2 used 36 Angus, 31 Brahman, 9 Hereford, 14 Senepol, 19 H X S, and 10 S X H heifers. On the hottest summer date in Trial 1, rectal temperature of Angus was greater ($P < .001$) than that of Brahman, Senepol, or Romosinuano. Rectal temperature and plasma cortisol were significantly less in Senepol than in Brahman, suggesting that the differences in rectal temperature between these breeds may be due to differences in stress response possibly related to differences in temperament. Reciprocal crosses of Hereford and Senepol had rectal temperatures nearly as low as that of Senepol and displayed substantial heterosis (-9.4%, $P < .05$) in log₁₀ rectal temperature on the hottest summer date. On both the hottest and coolest dates in Trial 1, Angus heifers had significantly faster respiration rates than Brahman, Romosinuano, or Senepol heifers, and Brahman had significantly slower respiration rates than Romosinuano or Senepol. On the hottest summer date in Trial 2, rectal temperature in Angus heifers was greater ($P < .001$) than in Brahman or Senepol heifers. Reciprocal crosses of Hereford and Senepol had rectal temperatures similar to that of Senepol, and heterosis for log₁₀ rectal temperature was similar to that in Trial 1 (-9.8%, $P < .05$). Considering rank

order among breeds, Brahman always had the slowest respiration rate and greatest packed cell volume. Brahman had significantly greater temperament scores and plasma cortisol concentrations than Angus or Senepol, except that plasma cortisol was not different between Brahman and Senepol on the hottest summer date. On this date, rectal temperature did not differ between Brahman and Senepol, which supports the hypothesis that there is a relationship between response to stress and rectal temperature that helps explain differences in rectal temperature between Brahman and Senepol. The results of these trials demonstrate heat tolerance of the Senepol and Romosinuano, two *Bos taurus* breeds. Furthermore, the results suggest a substantial level of dominance of the Senepol's ability to maintain constant body temperature in a hot environment as measured by rectal temperature in crosses with a nonadapted breed.

Keywords: beef cattle, beef breeds, romosinuano, brahman, aberdeen-angus, hereford, crossbreds, heifers, body temperature, blood plasma, hydrocortisone, temperament, heterosis, respiration rate, hematocrit, environmental temperature, heat tolerance, Florida.

Hanset, R. (1996). **Animal breeding and welfare: the case of the White-Blue Belgian Breed.** [Selection et bien-etre animal: le cas du Blanc-Bleu Belge.] *Elevages Belges* 50(12): 11-15, ISSN: 0770-2116.

Keywords: beef cattle, selection, animal physiology, induced parturition, caesarean section, beef, quality, meat yield, animal performance, reproduction, Belgium, French language.

Hickman, C.G. (1991). **Cattle Genetic Resources** Elsevier Science Publishers: Amsterdam; New York, 313 p., ISBN: 0-444-88638-9.

NAL Call Number: SF201 C37 1990.

Keywords: origin, history, genetic resource management, conservation, research institutions, disease resistance, crossbreeding, double-muscling, domestication, genetic types, improvement in traditional cattle breeding, introduction of foreign breeds, Criollo cattle of Latin America, milk production in the semi-tropical and tropical zones, cattle for work, buffaloes, draught cattle, population genetics, molecular markers, phylogenetic patterns, world resources, West Africa, Latin American, Caribbean, North America.

Hirooka, H. (2000). **Evaluation of testing schemes with clones for carcass traits in beef cattle.** *Animal Science Journal* 71 (7): J19-J25, ISSN: 1344-3941.

NAL Call Number: SF1 A542.

Keywords: beef bulls, clone testing scheme, breeding method, progeny testing, scheme, breeding method, carcass traits, genetic gains, heritability, selection index, Japanese language, Japan.

Hirooka, H.; Groen, A.F. (1999). **Effects of production circumstances on expected responses for growth and carcass traits to selection of bulls in Japan.** *Journal of Animal Science* 77(5): 1135-1143. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Economic values of growth and carcass traits in Japanese beef cattle for production systems with various types of integration of levels/stages (cow-calf and feedlot segments and the integrated system) and production circumstances (including 20% higher genetic levels of the traits, management, and economic alternatives) were used to examine responses to selection. Discounted economic values with interest rates of 0, 4.2 (Japanese average), and 8.4% were obtained to investigate the effect of discounting on selection efficiency. Traits considered were daily gain in the feedlot, marbling score, birth weight, weaning weight, and mature weight. The effects of discounting were small. Correlated responses to selection were not always economically favorable for all situations. Selecting

bulls for the base situation (i.e., the typical biological and economic conditions for the production of Japanese Black cattle) resulted in negative genetic changes in weaning weight and mature weight in the feedlot segment. Higher genetic levels of daily gain and weaning weight affected efficiency of selection. Although effects of management and economic alternatives on responses to selection were generally small, lighter market weight influenced responses to selection. The results indicate that predicted correlated responses to selection are sensitive to production systems and some production circumstances.

Keywords: beef bulls, artificial selection, selection program, breeding, breeding programs, progeny testing, economic analysis, selection responses, efficiency, live weight gain, feedlots, body fat, muscles, birth weight, weaning weight, live weight, genetic gain, husbandry, Japan.

Hirooka, H.; Groen, A.F.; Hillers, J. (1998). **Developing breeding objectives for beef cattle production 2. Biological and economic values of growth and carcass traits in Japan. Developing breeding objectives for beef cattle production 1. A bio-economic simulation model.** *Animal Science Journal* 66(3): 607-621. ISSN: 1344-3941.

NAL Call Number: SF1 A542.

Keywords: carcass composition, simulation models, breeding methods, meat production, growth, energy, feed conversion efficiency, economics.

Holloway, J.W.; Warrington, B.G.; Forrest, D.W.; Randel, R.D. (2002). **Prewaning growth of F₁ tropically adapted beef cattle breeds x Angus and reproductive performance of their Angus dams in arid rangeland.** *Journal of Animal Science* 80 (4): 911-918, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Brahman, Senepol, Tuli, Angus, breed, sex differences, preweaning performance, calves, adaptation, growth, weight gain, genotype environment interaction, performance evaluation, meat production, reproductive performance, comparative study, Texas, semi arid zone, tropical zone.

Jordana, J.; Piedrafita, J. (1996). **The "Bruna dels Pirinies" (Pyrenean brown breed): A genetic study of a rare cattle breed in Catalonia (Spain).** *Biochemical Systematics and Ecology* 24 (6): 485-498, ISSN: 0305-1978.

NAL Call Number: QD415 A1B5.

Keywords: Bruna Dels Pirinies, Pyrenean brown cattle, rare breed, genetic resources, conservation, Food and Agriculture Organization of the United Nations, gene flow, genetic structure, genetic variability, global data bank on domestic animal diversity, inbreeding, migratory path, population genetics, subpopulation interrelationship, Spain.

Keane, M.G.; Allen, P. (2002). **A comparison of Friesian-Holstein, Piemontese X Friesian-Holstein and Romagnola X Friesian-Holstein steers for beef production and carcass traits.** *Livestock Production Science* 78 (2): 143-158, ISSN: 0301-6226.

NAL Call Number: SF1.L5.

Keywords: beef cattle, steers, beef breeds, breed differences, carcass composition, carcass quality, Romagnola, Holstein-Friesian, Piemontese, evaluation, genetic variation, animal husbandry, feed rations, feed intake, finishing, duration, concentrates, feed supplements, grass silage, body fat, bones, muscles, fat.

Klautschek, G.; Dietl, G. (1996). **Plan of genetic effects between cattle breeds with regard of fattening and slaughter value features.** [Versuchsplan zur Schatzung genetischer

Effekte zwischen Rassen bei Mast- und Schlachtleistungsmerkmalen.] *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* (291): 39-52, ISSN: 1232-3071.

Keywords: genetic parameters, breeding value, heritability, selection criteria, slaughter weight, meat yield, animal performance, body weight, German language.

Le Neindre, P.; Boivin, X.; Trillat, G. (1996). **Reactions of Limousine cattle to handling. [Reactions des bovins limousins lors des manipulations.]** *Comptes Rendus de l'Academie d'Agriculture de France* 82(2): 71-80, ISSN: 0989-6988.

NAL Call Number: S5 C65.

Keywords: Limousine, breeds, domestication, husbandry methods, behavior, genetic variation, French language, France..

Lee, C. (2002). **On the negative estimates of direct and maternal genetic correlation: A review.** *Asian-Australasian Journal of Animal Sciences* 15 (8):1222-1226, ISSN: 1011-2367.
NAL Call Number: SF55.A78A7

Keywords: direct genetic effects, genetic correlations, inbreeding, maternal genetic effects, selection bias, weaning weight.

Lee, D.H.; Bertrand, J.K. (2002). **Investigation of genotype X country interactions for growth traits in beef cattle.** *Journal of Animal Science* 80 (2): 330-337, ISSN: 0021-8812.
NAL Call Number: 49 J82.

Keywords: algorithms, weights, birth, weaning, growth traits, analysis, genotype environment interactions, biological effects, geography, heritabilities, phenotypes, Argentina, Uruguay, Canada, USA.

Lee, C.; Pollak, E.J. (2002). **Genetic antagonism between body weight and milk production in beef cattle.** *Journal of Animal Science* 80 (2): 316-321, ISSN: 0021-8812.
NAL Call Number: 49 J82.

Keywords: milk production, Bayesian theory applications, body weight, genetic antagonism, genetic correlation estimates, genetic variance component, heritability estimates, Korea.

Lewis, I.M.; McClintock, A.E.; French, A.J.; Zuelke, K.A.; Harford, B.A.; Trounson, A.O. (2000). **Cloning and transgenesis in farm animals: An Australian perspective.** *Australian Veterinary Journal* 78(10): 694-698, ISSN: 0005-0423.
NAL Call Number: 41.8 Au72.

Keywords: beef cattle, calf, dairy cattle, goat, sheep, lamb, genetic cloning, genetic method, transgenesis, genetic method, farm animal cloning, genetic diversity.

Lowman, B.G.; Hinks, C.E.; Hunter, E.A.; Scott, N.A. (1996). **Effect of breed type, sex, method of rearing and winter nutrition on lifetime performance and carcass composition in a 20 month beef system: grazing performance.** *Animal Science: An International Journal of Fundamental and Applied Research* 63(2): 215-222.
NAL Call Number: SF1 A56.

Keywords: grazing, winter, cattle suckling, males, females, body condition, pastures height, weight gain, sex, biological differences, feeding level.

Lykins, L.E.Jr.; Bertrand, J.K.; Baker, J.F.; Kiser, T.E. (2000). **Maternal birth weight breeding value as an additional factor to predict calf birth weight in beef cattle.** *Journal of Animal Science* 78 (1): 21-26, ISSN: 0021-8812.
NAL Call Number: 49 J82.

Keywords: Angus, breed, calves, birth weight, gestation length, breeding seasons, calf birth weights, genetic variation, maternal birth weights.

Makulska, J.; Weglarz, A. (2000). **Evaluation of progeny rearing results of five beef breeds maintained without cowsheds. [Hodnoceni prubehu odchovu telat peti masnych plemen chovanych v masnych stadech.]** *Collection of Scientific Papers, Series for Animal Sciences: Faculty of Agriculture in Ceske Budejovice* 17(1): 11-17, ISSN: 1212-558X.

NAL Call Number: SF1.S26

Keywords: calves, heifers, bulls, breeds, Simmental, Limousine, Hereford, Salers, Red Angus, evaluation, parturition, reproduction, winter, spring, birth weight, weight gain, weaning, weaning weight, animal performance, body weight, age, milk yield, animal feeding, husbandry methods, Poland.

Maudet, C.; Luikart, G.; Taberlet, P. (2002). **Genetic diversity and assignment tests among seven French cattle breeds based on microsatellite DNA analysis.** *Journal of Animal Science* 80 (4): 942-950, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breeds, Abondance, Charolais, Limousin, Montbeliarde, Tarentaise, Villard de Lans, microsatellite DNA analysis, genetic method, principal components analysis, microsatellite DNA analysis, breeding, genetic assignment tests, genetic diversity, genetic variation, microsatellite genotype data.

Meyer, K. (1997). **Estimates of genetic parameters for weaning weight of beef cattle accounting for direct, maternal environmental covariances.** *Livestock Production Science* 52 (3): 187-199, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: Hereford, Angus, Hereford, Limousin, maternal effects, regression analysis, weaning weight, environmental covariances, genetic parameters, sire x herd, year interaction.

Mir, P.S.; Bailey, D.R.C.; Mir, Z.; Jones, S.D.M.; Entz, T.; Husar, S.D.; Shannon, N.H.; Robertson, W.M. (1997). **Effect of feeding barley based diets on animal performance, carcass characteristics and meat quality of crossbred beef cattle with and without Wagyu genetics.** *Canadian Journal of Animal Science* 77 (4): 655-662, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: heifers, steers, Wagyu, breed, crossbred, growth performance, carcass characteristics, meat quality, marbling grade, barley, based diets. carcass characteristics.

Miranda, M.E.; Amigues, Y.; Boscher, M.Y.; Menissier, F.; Cortes, O.; Dunner, S. (2002). **Simultaneous genotyping to detect myostatin gene polymorphism in beef cattle breeds.** *Journal of Animal Breeding and Genetics* 119 (6): 361-366, ISSN: 0931-2668.

NAL Call Number: 442.8 Z35.

Keywords: bovine muscular hypertrophy, muscle disease, myostatin gene, mutation, polymorphism, oligonucleotide ligation assay, genetic techniques, simultaneous genotyping.

Mukai, F.; Yamagami, A.; Anada, K. (2000). **Estimation of genetic parameters and trends for additive direct and maternal genetic effects for birth and calf, market weights in Japanese Black beef cattle.** *Animal Science Journal* 71(5): 462-469, ISSN: 1344-3941.

NAL Call Number: SF1 A542.

Keywords: Japanese Black, breed, calf, cows, beef production efficiency, birth weight, body weight, genetic correlation, growth, heritability

Mwansa, P.B.; Crews, D.H. Jr; Wilton, J.W.; Kemp, R.A. (2002). **Multiple trait selection for maternal productivity in beef cattle.** *Journal of Animal Breeding and Genetics* 119 (6): 391-399, ISSN: 0931-2668.

NAL Call Number: 442.8 Z35.

Keywords: Hereford, breed, maternal productivity index, birth weight, heritability estimates, multiple trait selection, survival, weaning weight.

Naruse, M.; Kajikawa, H.; Morita, H.; Hashiba, K.; Maruyama, S.; Morimoto, H.; Miura, Y.; Fujita, K.; Fuke, T.; Amari, M.; Masaki, S.; Ozutsumi, K.; Abe, A. (1996). **Relationships of dietary and ruminal characteristics to carcass traits in Wagyu steers (*Bostaurus*)**. *Animal Science and Technology* 67(2): 146-152, ISSN: 0918-2365.

NAL Call Number: 49 N62.

Keywords: breed, Wagyu (Japanese Black cattle), feeds, rumen digestion, volatile fatty acid (vfa), feed intake, carcass composition fat deposition, longissimus muscle, marbling score, rib-eye area.

Nazabekov, B.; Jumabayev, M.; Jazylbekov, N.A. (1997). **Creation of a new beef breed on the basis of Santa Gertrude. [Sozdanie novej porody myasnogo skota na osnove Santa-Gertruda.]** *Bulletin of Agricultural Science of Kazakhstan* 9: 90-97.

NAL Call Number: S471 C6N87.

Keywords: bulls, breed, Santa Gertrude, crossbreeding, selection, high yielding breeds, breeding methods, selection, autosexing, pasture grazing, utilization of coarse fibered plants, russian language, Kazakhstan.

Newman, S.; Stewart, T.S.; Goddard, M.E.; Gregory, M. (1997). **Hotcross-a decision support aid for crossbreeding of beef cattle in tropical and subtropical environments.** In: *Breeding ... Responding to Client Needs. Association for the Advancement of Animal Breeding and Genetics. Proceedings of the Twelfth Conference, Dubbo, NSW, Australia 6th-10th April 1997: Part 1*, AAABG Distribution Service c/- A.G.B.U: Armidale, Australia, pp.400-404, ISBN: 0-9595125-7-8.

Keywords: beef production, crossbreeding, decision analysis, computer software, predicting differences between genotypes, traits, temperature, nutrition, parasitism.

Ngadiyono, N. (1996). **Production performance of male Sumba Ongole, Brahman Cross and Australian Commercial Cross grown in a feedlot system. [Penampilan produksi sapi Sumba Ongole, Brahman Cross dan Australian Commercial Cross yang dipelihara secara intensif.]** *Buletin Peternakan* 20: 18-27, ISSN: 0126-4400.

NAL Call Number: SF600 B94.

Keywords: breed differences, Sumba Ongole (SO), Brahman Cross (Bx) and Australian Commercial Cross (ACC), intensive husbandry, growth rate, feed intake, carcass composition, fattening, feed conversion efficiency, body weight, slaughter weight, Indonesian Language, Indonesia.

Obata, T.; Takeda, H.; Satoh, M.; Wada, Y. (1996). **Progress in breeding techniques for effective beef cattle production in Japan.** *Japan Agricultural Research Quarterly* 30 (3): 203-211, ISSN: 0021-3551.

NAL Call Number: S19 J3.

Keywords: best linear unbiased prediction animal model, breeding technique, cattle productivity, mathematical model, miscellaneous method, multiple ovulation, embryo transfer, Japan.

Oka, A.; Iwaki, F.; Dohgo, T.; Ohtagaki, S.; Noda, M.; Shiozaki, T.; Endoh, O.; Ozaki, M.. (2002). **Genetic effects on fatty acid composition of carcass fat of Japanese Black Wagyu steers.** *Journal of Animal Science* 80 (4): 1005-1011, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breed, Japanese Black Wagyu, steers, fatty acid, carcass fat composition, monounsaturated fatty acids, carcass, carcass fat, carcass fat fatty acid composition, genetic effects.

Parminter, T. G.; Wilkinson, R. L.; Tarbotton, I. S.; Carter, J. L.; McMillan, W. H.; Smeaton, D. C. (1997). **Technology design and marketing: case studies in beef cattle breeding.** *Proceedings of the New Zealand Society of Animal Production* 57: 112, ISSN: 0370-2731.
NAL Call Number: 49.9 N483.

Keywords: beef cattle, case studies, technology, breeding, artificial insemination, sex control, semen, programs, sires, embryo transfer, management, beef production, farmers' attitudes, New Zealand.

Payne, W.J.A.; Hodges, J. (1997). **Tropical Cattle: Origins, Breeds, and Breeding Policies** Blackwell Science: Oxford; Malden, MA, 328 p., ISBN: 0632040483,
NAL Call Number: SF196 T7P385 1997.

Keywords: husbandry, tropics, subtropics, breeds, history, origin, genetics, breeds of Africa, the Americas, Asia, Oceania, breeding strategies, socio-economic conditions, biotechnology, genetic improvement.

Pereira, L.P.; Restle, J.; Brondani, I.L.; Alves Filho, D.C.; Silva, J.H.S. da; Muehlmann, L.D. (2000). **Growth of beef cattle from different genetic groups of Charolais x Nellore intact or castrated at eight months. (Desenvolvimento ponderal de bovinos de corte de diferentes grupos geneticos de Charoles x Nelore inteiros ou castrados aos oitos meses.)** *Ciencia Rural* 30(6): 1033-1039, ISSN: 0103-8478.

NAL Call Number: S192 R4.

Keywords: natural pastures, sexual behavior, crossbreeding, feedlot, weaning, Portuguese language, Brazil.

Perez, A.; Pinedo, C.; Gonzalez, H. (1997). **Characterization of biological types of beef cattle under an extensive rangeland system.** *Journal of Animal Science* 75 (SUPPL. 1): 105, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Charolais x Hereford, breed, calving difficulty, characterization, extensive rangeland system, genetic parameters.

Perotto, D.; Abrahao, J.J. dos S.; Moletta, J.L. (2000). **Quantitative carcass traits of Zebu and crossbred Bos taurus x Zebu. [Características quantitativas de carcaca de bovinos Zebu e de cruzamentos Bos toaurus x Zebu.]** *Revista Brasileira de Zootecnia* 29(6)(Suppl. 1): 2019-2029, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: crossbreeding, breed, Zebu, carcasses, feedlots, age, weight, slaughtering, Portuguese language, Brazil.

Perotto, D.; Moletta, J.L.; Lesskiu, C. (2002). **Feedlot performance of Canchim, Aberdeen Angus and reciprocal crossbred males. [Desempenho em confinamento de machos bovinos inteiros Canchim, Aberdeen Angus e cruzamentos rec procos.]** *Ciencia Rural* 32(4): 669-674, ISSN: 0103-8478.

NAL Call Number: S192 R4.

Keywords: beef cattle, feedlots, weight gain, feed conversion efficiency, crossbreeding, animal performance, diet, parana, digestibility, Portuguese language, Brazil.

Piedrafita, J.; Manteca, X. (2002). **Genetic improvement of behaviour and welfare in ruminant livestock.** [Mejora genetica del comportamiento y del bienestar del ganado rumiante.] *ITEA Produccion Animal*.98A(2):195-215.

NAL Call Number: S15 I8.

Keywords: beef cattle, cows, dairy cattle, sheep, genetic improvement, selection, adaptation, behavior, production, extensive production, animal welfare, stress, Spanish language.

Purwanto, B.P.; Santoso, A.B.; Fujimoto, F.; Yamamoto, S. (2000). **Evaluation of heat tolerance index in breeding beef cattle.** *Asian, Australasian Journal of Animal Sciences* 13 (Supplement Vol. B): 258, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: adaptability, animal production, heat loss balance, heat tolerance index, hot environments, thermal factors, thermo-regulatory processes.

Ramirez, V.R.; Misztal, I.; Bertrand, J.K. (1999). **Comparison of threshold and linear models for calving difficulty in beef cattle.** *Journal of Animal Science* 77(SUPPL. 1): 144, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breeding value, linear model, mathematical model, reproductive performance, calving difficulty, threshold model, mathematical model.

Re, C. del (1997). **Past - present and future in the rearing of Maremmana breed (Tuscany).** [Passato - presente e futuro nell'allevamento del bovino Maremmano (Toscana).] *Meeting on relationships between animal production and protected areas.* *Zootecnica e Nutrizione Animale* 23(Suppl.5): 123-125, ISSN: 0390-0487.

NAL Call Number: SF1 Z6.

Keywords: Maremmana breed, breed conservation, breed improvement, genotypes, animal breeding, Italian language.

, H. (1998). **Influence of environmental and genetical factors on the productive and reproductive behaviour of Hereford cattle in a farm of the tenth region, Chile.** [Influencia de factores ambientales y geneticos en el comportamiento productivo y reproductivo del ganado Hereford en un predio de la Decima region, Chile.] Thesis Degree Tesis (Ing Agr), Universidad Austral de Chile, Fac. de Ciencias Agrarias: Valdivia, Chile, 120 p.

Keywords: breeds, environmental factors, parturition, seasons, sex, birth weight, heritability, phenotypes, genotypes, genetic correlation, productivity, reproductive performance, body weight, thesis, Spanish language, Chile.

Restle, J.; Pascoal, L.L.; Faturi, C.; Alves Filho, D.C.; Brondani, I.L.; Pacheco, P.S.; Peixoto, L.A. de O. (2002). **Breed and heterosis effects on carcass quantitatives traits of feedlots finished cull cows.** [Efeito do grupo gen tico e da heterose nas caracter sticas quantitativas da carca a de vacas de descarte terminadas em confinamento.] *Revista Brasileira de Zootecnia* 31(1): 350-362, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: beef cattle, carcasses, weight, hybrids, crossbreeding, feedlots, fattening, feeding, husbandry methods, bovidae, boviniae, breeding methods, Portuguese language, Brazil.

Restle, J.; Quadros, A.R.B.; de, Vaz, F.N. (2000). **Feedlot finishing of steers of different genotypes of Hereford x Nellore.** [Terminacao em confinamento de novilhos de diferentes genotipos de Hereford x Nelore.] *Revista Brasileira de Zootecnia* 29(1): 125-130, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: crossbreeding, feedlots, animal performance, breeding methods, Portuguese language, Brazil.

Restle, J.; Brondani, I.L.; Flores, J.L.C.; Vaz, F.N.; Antunes, C. (1999). **Performance of genotypes of steers for slaughter at fourteen months, produced by females of two years. [Desempenho de genótipos de novilhos para abate aos catorze meses, gerados por fêmeas de dois anos.]** *Pesquisa Agropecuária Brasileira* 34(11): 2123-2128, ISSN: 0100-204X.

NAL Call Number: S15 P452.

Keywords: beef cattle, dairy cattle, feedlots, animal performance, slaughtering, animal husbandry methods, Portuguese language, Brazil.

Riley, D.G.; Chase, C.C. Jr.; Hammond, A.C.; West, R.L.; Johnson, D.D.; Olson, T.A.; Coleman, S.W. (2002). **Estimated genetic parameters for carcass traits of Brahman cattle.** *Journal of Animal Science* 80 (4): 955-962, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breed, Brahman, carcass traits, estimated genetic parameters, carcass yield, feedlots, genetic parameters, yield performance.

Rust, T.; Groeneveld, E. (2002). **Variance component estimation on female fertility traits in beef cattle.** *South African Journal of Animal Science* 31 (3-4):131-141, ISSN: 0375-1589.
NAL Call Number: SF1.S6

Keywords: genetics, age at first calving, breeding, calf survival, calving date, calving ease, calving interval, calving rate, calving success, days to calving, days to calving age, female fertility, traits, variance component, estimation, South Africa.

Rust, T.; Groeneveld, E. (2002). **Variance component estimation of female fertility traits in two indigenous and two European beef cattle breeds of South Africa.** *South African Journal of Animal Science* 32 (1): 23-29, ISSN: 0375-1589.

NAL Call Number: SF1.S6

Keywords: breed, Afrikaner, Angus, Drakensberger, Simmentaler, additive genetic variance, calving, fertility, heritability.

Schaeffer, L.R. (2001) **Multiple trait international bull comparisons.** *Livestock Production Science* 69(2): 145-153, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: estimated breeding values, multiple trait, multiple country, international evaluation model, Bayesian method, estimating the genetic covariances

Schmutz, S.M.; Stookey, J.M.; Winkelman-Sim, D.C.; Waltz, C.S.; Plante, Y.; Buchanan, F.C. (2001). **A QTL study of cattle behavioral traits in embryo transfer families.** *The Journal of Heredity* 92(3): 290-292. ISSN: 0022-1503.

NAL Call Number: 442.8 Am3.

Abstract: Two behavioral traits, temperament and habituation, were measured in 130 calves from 17 full-sib families which comprise the Canadian Beef Cattle Reference Herd. Using variance components, heritability was calculated as 0.36 for temperament and 0.46 for habituation. Genotyping of 162 microsatellites at approximately 20 cM intervals allowed the detection of six quantitative trait loci (QTL) for behavior traits on cattle chromosomes 1, 5, 9, 11, 14, 15.

Keywords: quantitative traits, loci, heritability, genetics, husbandry, animal behavior, temperament, habituation.

Schoeman, S.J.; Jordaan, G.F.; Skrypzeck, H. (2000). **The influence of proportion of Simmentaler breeding in a multibreed synthetic beef cattle population on preweaning growth traits.** *South African Journal of Animal Science* 30(2): 98-109, ISSN: 0375-1589.

NAL Call Number: SF1.S6

Keywords: multibreed composite beef cattle, Simmentaler, breed, intensive irrigated grazing conditions, additive heritabilities, maternal heritabilities, calves, birth weight, weaning weight.

Schoeman, S.J.; Jordaan, G.F. (1999). **Multitrait estimation of direct and maternal (co)variances for growth and efficiency traits in a multibreed beef cattle herd.** *South African Journal of Animal Science* 29(3): 124-136, ISSN: 0375-1589.

NAL Call Number: SF1.S6

Keywords: multibreed beef cattle, Kleiber ratio, postweaning, preweaning, cow efficiency, growth, efficiency trait, covariance, direct, maternal, multitrait estimation, multibreed herd, relative growth rate, postweaning, preweaning, weaning index, weaning weight.

Schoeman, S.J. (1996). **Characterization of beef cattle breeds by virtue of their performances in the National Beef Cattle Performance and Progeny Testing Scheme.** *Suid-Afrikaanse Tydskrif vir Veekunde* 26(1): 15-19, ISSN: 0375-1589.

NAL Call Number: SF1 S6.

Keywords: bulls, growth, body weight data, National Beef Cattle Performance, progeny testing.

Silva, T.J.P.; Pacheco, M.H.S.; Benevides Filho, I.M.; Norte, A.L. (2001). **Weight evaluation at weaning of bovine from different genetic groups. [Avaliacao do peso a desmama de bovinos oriundos de diferentes grupamentos geneticos.]** *Revista Brasileira de Reproducao Animal* 25 (2): 221-222, ISSN: 0102-0803.

NAL Call Number: QP251 R48.

Keywords: beef breeds, Holstein x Zebu, breed-Red Angus x Zebu, breed-Red Angus x Zebu x Santa Gertrudis, Zebu, crossbreds, cow, calf, weaning weight, forages, Brachiaria brizantha, Brachiaria decumbens, Brachiaria humidcula, Portuguese language.

Simm, G.; Conington, J.; Bishop, S.C.; Dwyer, C.M.; Pattinson, S. (1996). **Genetic selection for extensive conditions.** *Applied Animal Behaviour Science* 49(1): 47-59, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: beef cattle, sheep, selection, adaptation, extensive husbandry, animal welfare, behavior, disease resistance, animal husbandry methods, extensive farming systems.

Singh, K. (2002). **Beef production in India.** In: *Development Strategies for Genetic Evaluation for Beef Production in Developing Countries. Proceedings of an International Workshop Held in Khon Kaen Province, Thailand, 23-28 July 2001*, ACIAR Proceedings No. 108, Allen, J.; Na-Chiangmai, A.(eds.), p Australian Centre for International Agricultural Research (ACIAR): Canberra, Australia, pp.34-39, ISBN: 1-86320-327-3.

Keywords: beef cattle, beef production, breeding programs, crossbreds, Holstein Friesian, Brown Swiss, Jersey, native livestock, exotic breeds, genetic conservation, performance traits, India.

Skrypzeck, H.; Schoeman, S.J.; Jordaan, G.F.; Naser, F.W.C. (2000). **Estimates of crossbreeding parameters in a multibreed beef cattle crossbreeding project.** *South African Journal of Animal Science* 30(3-4): 193-203, ISSN: 0375-1589.

NAL Call Number: SF1 S6.

Keywords: purebred and crossbred cattle, Afrikaner, Simmentaler, Hereford, breeds, intensive management, high stocking rate, breed direct effects, individual heterotic effects, birth weight, weaning weight.

Skrypzeck, H.; Schoeman, S.J.; Jordaan, G.F.; Naser, F.W.C. (2000). **Pre-weaning growth traits of the Hereford breed in a multibreed composite beef cattle population.** *South African Journal of Animal Science* 30(3-4): 220-229, ISSN: 0375-1589.

NAL Call Number: SF1 S6.

Keywords: multibreed composite beef cattle, cows, calves, Hereford genes, intensive irrigated grazing conditions, direct additive heritability, maternal heritability, maternal permanent environmental effects, birth weight, weaning weight, growth traits, breeding value.

Splan, R.K.; Cundiff, L.V.; Dikeman, M.E.; Van Vleck, L.D. (2002). **Estimates of parameters between direct and maternal genetic effects for weaning weight and direct genetic effects for carcass traits in crossbred cattle.** *Journal of Animal Science* 80 (12):3107-3111, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: crossbred beef cattle, consumer preferences, meat product, quality parameters, carcass traits, genetic effects, genetic correlations, estimates, maternal, weaning weights.

Splan, R.K.; Cundiff, L.V.; Van Vleck, L.D. (1998). **Genetic parameters for sex, specific traits in beef cattle.** *Journal of Animal Science* 76 (9): 2272-2278, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: heifers, steers, paternal half sibs, genetics, female, growth, reproductive traits, calving difficulty, male, carcass traits, gender difference.

Sprinkle, J.E.; Ferrell, C.L.; Holloway, J.W.; Warrington, B.G.; Greene, L.W.; Wu, G.; Stuth, J.W.. (1998). **Adipose tissue partitioning of limit-fed beef cattle and beef cattle with ad libitum access to feed differing in adaptation to heat.** *Journal of Animal Science* 76(3):665-73. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breeds, Angus, Hereford, Boran, Brahman, Tuli, cross steers, fat distribution, lipoprotein lipase (LPL) activity, subtropics, differences in adaptability, adipose tissue, samples from perirenal, omental, subcutaneous depots, carcass measurements, omental, external, seam fat trim.

Sprinkle, J.E.; Holloway, J.W.; Warrington, B.G.; Hufstedler, G.D.I.; Stuth, J.W.; Forbes, T.D.A.; Greene, L.W.; Wu, G.; Ellis, W. C. (1996). **Adipose tissue dynamics of grazing beef cattle differing in adaptation to heat.** *Journal of Animal Science* 74 (SUPPL. 1): 124, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: lipoprotein lipase, adipocytes, breeding, breeds, lactational state, lipoprotein lipase, meeting abstract, season, weight.

Sprinkle, J.E.; Holloway, J.W.; Warrington, B.G.; Ellis, W. C.; Stuth, J.W.; Forbes, T.D.A.; Greene, L.W. (2000). **Digesta kinetics, energy intake, grazing behavior, and body temperature of grazing beef cattle differing in adaptation to heat.** *Journal of Animal Science* 78(6): 1608-1624, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: subtropics, Brahman, American Angus, Tuli, cows, cattle breeds, crossbreeding, crosses, breed differences, body condition, body temperature, cattle feeding, digesta, digestive tract, energy intake, environmental factors, environmental temperature, grazing, feeding behaviour, feed intake, heat adaptation, lactation.

Steen, S. (1997). **Studies into adaptation of mother cows of Deutsche Schwarzbunte, Deutsche Rotbunte and of crossbreed Galloway x Holstein-Friesian and their offspring during the grazing period.** [Studien zur Anpassung der Mutterkuhe der Rassen Deutsch Schwarzbunte, Deutsch Rotbunte und der Kreuzung Galloway x Holstein-Friesian sowie ihrer Nachkommen waehrend des Weideganges.] In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry Held Dec 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL: Braunschweig-Voelkenrode, Germany, pp. 88-109, Series title, Landbauforschung Voelkenrode. Sonderheft (Germany), no. 177, ISSN: 0376-0723.
NAL Call Number: 18 L2353 Suppl.

Keywords: breeds, Deutsche Schwarzbunte, Deutsche Rotbunte, Galloway x Holstein-Friesian, mother cows, calves, grazing systems, extensive husbandry, blood composition, lactation, pregnancy, growth, age, weight, nutritional status, urea, creatinine, calcium, blood proteins, German language, Germany.

Stefler, J. (1998). **The role of double-purpose cattle in producing good-class products.** [A vegyeshasznitasu szarvasmarhak szerepe a jominosegu termekeloallitasban.] "AGRO-21" Fuzetek 18: 79-86, ISSN: 1218-5329.

Keywords: multipurpose breeds, double-purpose Hungarian spotted cattle, Hungarian grey cattle, Mountain spotted cattle, animal breeding, population genetics, breed conservation, beef, keeping quality, technology, farm management, Hungarian language, Hungary.

Stewart, T.S.; Newman, S.; Goddard, M.; Gregory, M. (1997). **A decision support system to deal with genotype by environment interactions.** *Journal of Animal Science* 75 (SUPPL. 1): 147, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breeding, decision support system, genotype, environment interactions, performance traits.

Sullivan, P.G.; Wilton, J.W.; Miller, S.P.; Banks, L.R. (1999). **Genetic trends and breed overlap derived from multiple, breed genetic evaluations of beef cattle for growth traits.** *Journal of Animal Science* 77 (8): 2019-2027, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Angus, Hereford, Limousin, Charolais, Simmental, breeds, genetic evaluation, genetic method, meat, breed overlap, genetic trends, genetic variation, growth traits, reproductive capacity.

Tosh, J.J.; Kemp, R.A. (2000). **Genetic trends for weaning weight during development of a multibreed population of beef cattle in two contrasting environments.** *Canadian Journal of Animal Science* 80 (1): 191-193, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: multibreed beef cattle, genetic trends, weaning weight, environmental factors, genetic trends, natural selection, weaning weight.

van der Westhuizen, R.R.; Rust, T. (2002). **The effect of heterogeneity for yearling weights measured in different test phases of the South African National Beef Cattle Improvement Scheme.** *South African Journal of Animal Science* 32 (3):171-174, ISSN: 0375-1589.

NAL Call Number: SF1 S6.

Keywords: beef, breed, Afrikaner, calf, National Beef Cattle Improvement Scheme, test phase, estimated breeding value, selection process, yearling weight, heritability, heterogeneity, South Africa.

Villalba, D.; Casaus, I.; Sanz, A.; Estany, J.; Revilla, R. (2000). **Prewaning growth curves in Brown Swiss and Pirenaica calves with emphasis on individual variability.** *Journal of Animal Science* 78(5): 1132-40. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Pirenaica calves, Brown Swiss calves, breed differences, season of birth effects, preweaning growth curves, Spanish Pyrenees.

Wojcik, J.; Kamieniecki, H. (2000). **Results of comparison rearing young cattle of different beef-breeds with pasture advantage. [Porownanie wyników odchowu młodego bydła różnych ras mięsnych z wykorzystaniem pastwiska.]** *Annals of Warsaw Agricultural University. Animal Science* 35(Suppl.): 55-58, ISSN: 0208-5739.

Keywords: beef calves, bulls, heifers, breeds, Limousine, Salers, Red Angus, Simmental, pastoralism, grazing, weight gain, extensive farming, Polish language, Poland.

Yamamoto, N.; Koike, T.; Entsu, S.; Otani, I. (1997). **Economic evaluation of embryo transfer on animal production.** *Bulletin of the Chugoku National Agricultural Experiment Station* 17: 1-26, ISSN: 0913-4239.

NAL Call Number: S471 J3C84.

Keywords: milk and beef production, breed, Wagyu, embryo transfer, economic analysis, animal production, pregnancy, artificial insemination, Japanese language, Japan.

Feeding

Aguilar, C.; Ku, J. (1998). **Intake, rumen digestion and microbial nitrogen supply in beef cattle fed fresh swine excreta. [Consumo, digestión ruminal y suministro de nitrógeno microbiano en ganado para carne alimentado con excretas frescas de cerdos.]** *Revista Cubana de Ciencia Agrícola* 32(3): 265-273, ISSN: 0034-7485.

Keywords: rumen digestion, feed intake, nitrogen, swine excreta, Spanish language, Cuba.

Alderton, B.W.; Hixon, D.L.; Hess, B.W.; Woodard, L.F.; Hallford, D.M.; Moss, G.E. (2000). **Effects of supplemental protein type on productivity of primiparous beef cows.** *Journal of Animal Science* 78(12): 3027-3035, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cows, breed, Gelbvieh X Angus, supplemental degradable protein (DIP), undegradable protein (UIP), forage intake, body weight change, body condition score (BCS), postpartum interval to first estrus, conception rate, milk production, milk composition, serum metabolites, metabolic hormones, blood meal, animal feed supplement, native grass hay, soybean meal, trace, mineralized salt.

Alencar, M.M. de; Tullio, R.R.; Cruz, G.M. da; Correa, L. de A. (1996). **Grazing behavior of beef cows. [Comportamento de pastejo de vacas de corte.]** *Revista da Sociedade Brasileira de Zootecnia* 25(1): 13-21, ISSN: 0100-4859.

NAL Call Number: SF1 R45.

Keywords: beef cattle cows, grazing systems, animal feeding, behavior, feeding habits, feeding systems, Portuguese Language, Brazil.

Andrae, J.G.; Duckett, S.K.; Hunt, C.W.; Pritchard, G.T.; Owens, F.N. (2001). **Effects of feeding high-oil corn to beef steers on carcass characteristics and meat quality.** *Journal of Animal Science* 79(3): 582-588. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: yearling steers, high-oil corn, carcass characteristics, slaughter, postmortem, carcass. intramuscular lipid deposition, unsaturation of fatty acids.

Anigbogu, N.M. (2000). **Rumen content as a potential feed for livestock: Beef cattle fattening.** *Indian Journal of Animal Sciences* 70 (7): 754-755, ISSN: 0367-8318.

NAL Call Number: 41.8 IN22.

Keywords: beef cattle, goat, sheep, rumen contents, potential feed.

Araba, A.; Byers, F.M. (2002). **Environmentally friendly beef production from two genotypes fed cereal/molasses diets.** *Livestock Production Science* 77 (2-3): 301-309, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: breed, Holstein x Friesian, Holstein x native Brown of Atlas, bull, heifer, meat product, carcass merit, diet, dry matter, replaced barley, sugar beet molasses, animal feed, environmental friendly beef production, feed efficiency, genotype, growth, live weight gain, Morocco, Africa.

Aumaitre, A.; Aulrich, K.; Chesson, A.; Flachowsky, G.; Piva, G. (2002). **New feeds from genetically modified plants: Substantial equivalence, nutritional equivalence, digestibility, and safety for animals and the food chain.** *Livestock Production Science* 74 (3): 223-238, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: husbandry, beef cattle, dairy cows, chicken, egg, hen, rabbit, genetically modified organism, feeding, carcass merit, feed efficiency, food chain, food safety, growth rate, maize, milk production, nutrient digestibility, recombinant DNA technology.

Bail, C.A.T. de; Brondani, I.L.; Restle, J. (2000). **Concentrate levels during feedlot finishing for steers previously kept on native or cultivated pasture. [Níveis de concentrado na fase de terminacao em confinamento para novilhos previamente mantidos em pastagem nativa ou cultivada.]** *Ciencia Rural* 30(1): 151-157, ISSN: 0103-8478.

NAL Call Number: S192.R4

Keywords: feedlots, pastures, concentrates, weight gain, fattening, animal performance, Portuguese language, Brazil.

Baker, D.S.; Engle, T.E.; Whittier, J.C.; Burns, P.D.; Mortimer, R.G.; Schutz, D.N.; Enns, M. (2002). **Trace mineral impact on reproductive performance, immune response and calf performance in grazing beef cattle.** *Journal of Animal Science* 80 (Supplement 2):117, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: calf, crossbred beef cow, female, heifer, liver, IgG, dietary supplement, copper, manganese, zinc, humoral immune response, reproductive performance.

Bakrie, B.; Darma, J.; Tyasno; Mulyani (1996). **Utilization of fermented cassava leaf as a source of protein in cattle. [Pemanfaatan tepung daun singkong difermentasi sebagai sumber protein dalam ransum sapi potong.]** In: *Proceedings of Scientific Meeting on Animal Husbandry Research Results: Application for Small Scale Industry. [Prosiding Temu Ilmiah Hasil-hasil Penelitian Peternakan: Aplikasi Hasil Penelitian Untuk Industri Peternakan Rakyat.]* Basuno, E.; Mahyuddin, P.B.; Saepudin, Y.; Hidayat, S. (eds.), Balitnak: Bogor, Indonesia, pp. 123-130, ISBN: 979-8261-27-5.

Keywords: cattle feeds, soybean flake cassava, leaves, fermented products, proteins, dry matter intake, organic matter intake, chemical composition, feed consumption, Indonesian language, Indonesia.

Bass, R.; Swecker, W.S.; Eversole, D.E. (2001). **Effects of oral vitamin E supplementation during late gestation in beef cattle that calved in late winter and late summer.** *American Journal of Veterinary Research* 62(6): 921-927, ISSN: 0002-9645.

NAL Call Number: 41.8 Am3A.

Keywords: Angus, Hereford, breed effects, oral vitamin E supplementation, late gestation, serum vitamin E and IgG concentrations, stored forages.

Beauchemin, K.A.; Yang, W.Z.; Rode, L.M. (2001). **Effects of barley grain processing on the site and extent of digestion of beef feedlot finishing diets.** *Journal of Animal Science* 79(7): 1925-1936, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: feedlot finishing cattle, Jersey steers, breed, diet, effects of barley rolling, chewing activities, ruminal fermentation, extent of digestion, cannulated in the rumen and duodenum, dry matter intake.

Beretta, V.; Lobato, J.F.P. (1998). **Intensive beef cattle production system: Evaluation of alternative winter feeding strategies for replacement heifers.** *Revista Brasileira de Zootecnia* 27 (1): 157-163.

NAL Call Number: SF1 R45.

Keywords: heifers, Hereford, Aberdeen Angus, breed, Portuguese language, improved natural pasture, *Lolium multiflorum*, *Trifolium repens*, *Lotus corniculatus*, pasture forage, average daily gain, growth rate, feedlot system, intensive beef cattle production systems, winter feeding system.

Block, H.C.; McKinnon, J.J.; Mustafa, A.F.; Christensen, D.A. (2001). **Evaluation of the 1996 NRC beef model under western Canadian environmental conditions.** *Journal of Animal Science* 79(1): 267-275. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: dry lot feeding, diets, feed formulation, computer simulation, simulation models, live weight gain, finishing, body weight, cattle feeding, breed differences, American Angus, Charolais, Hereford (cattle breed), crossbreds, environmental temperature, wind speed, coat, depth, barley, barley silage, rapeseed oilmeal, straw, chemical composition, cold stress, accuracy, prediction, Saskatchewan.

Boadi, D.A.; Wittenberg, K.M. (2002). **Methane production from dairy and beef heifers fed forages differing in nutrient density using the sulphur hexafluoride (SF6) tracer gas technique.** *Canadian Journal of Animal Science* 82 (2): 201-206, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: breed, beef, Charolais x Simmental, dairy, Holstein, methane excretion, sulfur hexafluoride trace gas technique, measurement method, diet, dry matter intake, forage quality, in vitro organic matter digestibility, nutrient density.

Boadi, D.A.; Wittenberg, K.M.; McCaughey, W.P. (2002). **Effects of grain supplementation on methane production of grazing steers using the sulphur (SF6) tracer gas technique.** *Canadian Journal of Animal Science* 82 (2): 151-157, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: steer, methane excretion, sulfur hexafluoride tracer gas technique, measurement method, dry matter intake, forage quality, grazing season, legume grass, pasture grazing, rolled barley, total organic matter intake.

Boberfeld, W.O. von; Wohler, K.; Erhardt, G.; Gauly, M.; Urban, C.; Seufert, H.; Wagner, A. (2002). **Perspectives of grassland utilisation in peripheral regions.** [Nutzungsperspektiven für Grünland peripherer Regionen.] *Berichte über Landwirtschaft* 80 (3): 419-445, ISSN: 0005-9080.

NAL Call Number: 18 G31.

Keywords: animal production, beef cattle, farming systems, forage, grasslands, grazing, handling, herbage, labor costs, less favoured areas, nurse cows, behavior, temperament, breed

differences, pastures, production costs, production economics, stables, traits, German language, German.

Bodine, T.N.; Purvis, H.T. II (2003). **Effects of supplemental energy and/or degradable intake protein on performance, grazing behavior, intake, digestibility, and fecal and blood indices by beef steers grazed on dormant native tallgrass prairie.** *Journal of Animal Science* 81 (1) 304-317, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: steers, feeding, grazing, food supplement, energetic value, protein values, feeding behavior, food intake, digestibility, experimental study, corn flour, soybean meal, blood product, feces, fodder, rangeland.

Bowman, J.G.P.; Sowell, B.F.; Boss, D.L.; Sherwood, H. (1999). **Influence of liquid supplement delivery method on forage and supplement intake by grazing beef cows.** *Animal Feed Science and Technology* 78(3-4): 273-285, ISSN: 0377-8401.

NAL Call Number: SF95 A55.

Keywords: hay, supplements, feed intake, behavior, feeding habits; feeds, livestock.

Brito, R.M. de; Sampaio, A.A.M.; Cruz, G.M. da; Alencar, M.M. de; Barbosa, P.F.; Barbosa, R.T. (2002). **Comparison of diet evaluation systems for cattle in an intensive beef production model. II - Creep feeding.**[Comparacao de sistemas de avaliacao de dietas para bovinos no modelo de producao intensiva de carne. II - Creep feeding.] *Revista Brasileira de Zootecnia* 31 (2, Supplement): 1002-1010, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: analytical methods, beef cattle, calves, creep feeding, diets, evaluation, fattening performance, feed supplements, intensive husbandry, liveweight gain, nutrition, nutritive value, Portuguese language, Brazil.

Brosh, A.; Aharoni, Y.; Holzer, Z. (2002). **Energy expenditure estimation from heart rate: Validation by long-term energy balance measurement in cows.** *Livestock Production Science* 77 (2-3): 287-299. ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: beef cows, calves, body weight, diet, energy balance, energy expenditure, heart rate, lactation, late pregnancy, metabolizable energy, milk production, organic matter digestibility, oxygen consumption.

Broweleit, R.C.; Schacht, W.H.; Anderson, B.E.; Smart, A.J. (2000). **Forage removal and grazing time of cattle on small paddocks.** *Journal of Range Management* 53(3): 282-286.

NAL Call Number: 60.18 J82 .

Keywords: heifers, grazing experiments, experimental design, feeding behavior, controlled grazing, adaptation, plant height, biomass, tillers.

Brown, V.E.; Rymer, C.; Agnew, R.E.; Givens, D.I. (2002). **Relationship between in vitro gas production profiles of forages and in vivo rumen fermentation patterns in beef steers fed those forages.** *Animal Feed Science and Technology* 98 (1-2):13-24, ISSN: 0377-8401.

NAL Call Number: SF95 A55.

Keywords: nutrition, ammonia, short chain fatty acids, feed fermentability, gas production, hay, grass silage, dry matter, maize, silage, pH, rumen fermentation, whole-crop wheat.

Bruce, L.B. (1998). **Effect of selenium on cold adapted beef cattle.** *Asian-Australasian Journal of Animal Sciences* 11(3): 265-267, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: trace elements, selenium, deficiency, lesions, cold stress, energy demands, winter, cold adaptation, brown fat, adipose tissue, Alaska.

Byers, F.M. (1998). **Energy density of growth in beef cattle with respect to growth regulation strategies.** In: *Energy Metabolism of Farm Animals*, McCracken, K.J.; Unsworth, E.F.; Wylie, A.R.G. (eds.), CAB International: Wallingford, England, UK, pp. 355-358, ISBN: 0-85199-276-5.

NAL Call Number: SF94.6 S95 1997.

Keywords: estradiol, zeranol, energy accretion, fat accretion, growth, growth energy density, protein accretion.

Casass, I.; Sanz, A.; Bernu s, A.; Ferrer, R.; Revilla, R. (2001). **Weight change and energy supply of pasture in suckler cows under mountain conditions: effect of calving season.** [Variaci n de peso y aporte energ tico del pasto en vacas de cr a en condiciones de monta a: efecto de la poca de parto.] *Investigacion Agraria. Produccion y Sanidad Animales* 16(1): 109-125, ISSN: 0213-5035.

NAL Call Number: SF15 S7 A52 .

Keywords: suckler cows, beef cattle, parturition, grazing, body weight, livestock management, animal feeding, reproduction.

Caton, J.S.; Bauer, M.L.; Hidari, H. (2000). **Metabolic components of energy expenditure in growing beef cattle, Review.** *Asian, Australasian Journal of Animal Sciences* 13 (5): 702-710, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: metabolism, whole body energy use, maintenance, visceral tissues, liver, gastrointestinal tract, muscle, adipose tissues protein, synthesis, turnover, urea, meat, production, ion transport.

Charmley, E.; Wichtel, J.; Richardson, G.; Lofstedt, R. (2002). **The interaction between plane of nutrition and success of estrus synchronization using two methods.** *Journal of Dairy Science* 85 (Supplement 1): 206, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: gonadotropin releasing hormone, fertilitydrug, estradiol benzoate, intramuscular administration, progesterone, intravaginal device, drug delivery system, fertility drug, breeding method, estrus synchronization, Ovsynch, body weight, energy nutrition, estrus success, plane of nutrition correlation, parity, silage, animal feed, winter calving.

Cheeke, P.R (1998). *Applied Animal Nutrition: Feeds and Feeding*, 2nded., Prentice Hall: Hemel Hempstead, UK, 525 p., ISBN: 0-13-779331-6.

NAL Call Number: SF95 C463 1999.

Keywords: feeds, nutrition, analytical methods, nutrition, physiology, protein sources, energy sources, forage, minerals, trace elements, vitamins, feeding behaviour, water,

composition, processing, feed intake, beef cattle, cows, fish, animal welfare, exotics, furbearing animals, zoo animals, animal production, poultry.

Clark, J.H.; Ipharraguerre, I.R. (2001). **Biotech crops as feeds for livestock.** *Abstracts of Papers American Chemical Society* 222 (1-2): AGRO91 2001, Conference/Meeting: 222nd National Meeting of the American Chemical Society Chicago, Illinois, USA August 26-30, 2001, ISSN: 0065-7727.

NAL Call Number: 381 AM33Pa

Keywords: genetic enhancement technology, crops fed to livestock, insect protection, herbicide tolerance, composition, digestibility, feeding value.

Coetzee, H. (June 1997). **The cafeteria feedlot.** *Farmer's Weekly* 60-61.

NAL Call Number: 24 F225.

Keywords: beef cattle feedlots, unrestricted feeding, feeding systems, South Africa.

Coffey, K.P.; Coblenz, W.K.; Montgomery, T.G.; Shockey, J.D.; Bryant, K.J.; Francis, P.B.; Rosenkrans, C.F. Jr.; Gunter, S.A. (2002). **Growth performance of stocker calves backgrounded on sod-seeded winter annuals or hay and grain.** *Journal of Animal Science* 80 (4): 926-932, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: stocker calves, forage, animal feed, forage quality, grain, grazing season, growth performance, hay, sod-seeded winter annuals.

Corpet, D.E. (1999). **Mechanism of antimicrobial growth promoters used in animal feed.** *Comptes Rendus de l'Academie d'Agriculture de France* 85(7): 197-205, ISSN: 0989-6988.

NAL Call Number: S5 C65.

Keywords: poultry, pigs, veal calves, beef cattle, European regulations, antimicrobial growth promoter, concentrations, animal species, withdrawal periods, avilamycin, carbadox, flavomycin, monensin, olaquinox, salinomycin, average daily gain, growth, review paper, French language. Seroprevalence of *Babesia bovis* in cattle in the "Norte Fluminense" mesoregion.

D'Hour, P.; Josien, E.; Petit, M.; Lassalas, J. (1996). **Extending the grazing period for the suckler herd. [Allongement de la periode de paturage pour des vaches allaitantes.]** In: *Proceedings of the 3. meeting "Rencontres autour des recherches sur les ruminants". Paris (France), December 4 and 5 1996. [3. Rencontres autour des recherches sur les ruminants. Paris (France), les 4 et 5 decembre 1996.]* Institut de l'Elevage: Paris, France, p. 102, ISBN: 2-84148-022-4.

Keywords: beef cattle cows, grazing, duration, natural pastures, grassland management, grazing intensity, animal performance, animal feeding, behavior, French language, France.

Davies, I.H.; Munro, R. (1999). **Osteochondrosis in bull beef cattle following lack of dietary mineral and vitamin supplementation.** *Veterinary Record* 145 (8): 232-233, ISSN: 0042-4900.

NAL Call Number: SF601 I4.

Keywords: beef bulls, supplementary feeding, mineral deficiencies, nutrient deficiencies, animal welfare, osteochondritis, bone diseases, joint diseases, lameness, weight gain, coat quality, barley, sugarbeet pulp, molasses, protein mix, Ca, Na, P, Mg, Cu.

Davis, J.R.; Apple, J.K.; Hellwig, D.H.; Kegley, E.B.; Pohlman, F.W. (2002). **The effects of feeding broiler litter on microbial contamination of beef carcasses.** *Bioresource Technology* 84 (2): 191-196, ISSN: 0960-8524.

NAL Call Number: TD930 A32.

Keywords: Salmonella typhimurium, Escherichia coli O157:H7, carcass contamination, foodborne pathogen, grazing, microbial contamination, bioresource technology, broiler litter feeding.

Davis, C.L.; Drackley, J.K.; Tomkins, T. (1998). **The Development, Nutrition, and Management of the Young Calf** Iowa State University Press: Ames, Iowa, 1st. Ed., 339 p.

NAL Call Number: SF205 D37 1998.

Keywords: calf, care, management, anatomy, feeding, digestive system, energy and protein requirements, environmental temperature, metabolism, calving, colostrum, milk replacers, liquid feed, starter feed, housing, nutrition, husbandry.

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NAL Call Number: SF95 A55.

Keywords: grasses, silage, sodium bicarbonate, feed intake, ph, inorganic acid salts, chemico-physical properties, behavior.

Defoor, P.J.; Galyean, M.L.; Salyer, G.B.; Nunnery, G.A.; Parsons, C.H. (2002). **Effects of roughage source and concentration on intake and performance by finishing heifers.** *Journal of Animal Science* 80 (6): 1395-1404, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: finishing heifers, intake, performance, roughage concentration, roughage source.

DelCurto, T. (1999). **Supplementation strategies for beef cattle consuming low, quality forages in the Western US: An executive summary of a WCC 104 publication.** *Journal of Animal Science* 77 (SUPPL. 1): 200-201, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: low, quality forages, nutrition, supplementation strategies.

Deswysen, A.G.; Dutilleul, P.; Fischer, V.; Campbell, C.P. (1997). **Quantitative analysis of nycterohemeral eating and ruminating patterns in beef cattle fed pelleted concentrates with or without supplemental roughage.** *Canadian Journal of Animal Science* 77 (3): 375-384, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: Hereford steers, breed, quantitative analysis, eating, patterns, concentrates, roughage, timothy hay, feeding behavior, rumination, pelleted feeds, mastication, lucerne pellets, time spent eating.

Ely, D.G.; Aaron, D.K.; Johns, J.T.; Wyles, J.; Carver, L.A. (1997). **Use of a molasses, based supplement with fat to improve performance of beef cows and calves grazing endophyte, infected tall fescue.** *Journal of Animal Science* 75 (SUPPL. 1): 249, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: cow, calves, Angus, Beefmaster, breed, molasses, based supplements, animal feed, nutritional supplements, performance.

Eng, K. (1997). **Research addresses behavior, restricted intake on performance.** *Feedstuffs* 69(20): 19, 28.

NAL Call Number: 286.81 F322.

Keywords: heifers, steers, temperament, lambs, unrestricted feeding, feed intake, performance.

Engle, T.E.; Spears, J.W.; Brown, T.T. Jr. (1999). **Effects of dietary phosphorous and trace mineral source on immune function, mineral status, and performance of stressed steers.**

The Professional Animal Scientists 15(4): 238-244. Available online at:

<http://www.arpas.uiuc.edu/pas/pas.html>

NAL Call Number: SF51 P76.

Keywords: steers, dietary minerals, phosphorus, mineral supplements, weaning, stress, maize silage, soybean oilmeal, experimental infections, bovine rhinovirus, rhinotracheitis, live weight gain, feed intake, feed conversion, body temperature, antibody formation, morbidity, blood plasma, copper, zinc, inorganic trace minerals, organic trace minerals.

Estermann, B.L.; Wettstein, H.R.; Sutter, F.; Erdin, D.; Kreuzer, M. (2003). **Effect of calving period on herbage intake and nutrient turnover of Simmental and Angus suckler cows with Angus sired calves grazing subalpine and alpine pastures.** *Livestock Production Science* 79 (2-3): 169-182, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: Simmental, Angus, breed, suckler cows, herbage intake, dry matter, slow-release alkane capsules, alpine climate, body weight, calving period, nutrient turnover, pasture grazing, subalpine climate.

Fernandez, M.I.; Woodward, B.W. (1999). **Comparison of conventional and organic beef production systems. I. Feedlot performance and production costs.** *Livestock Production Science* 61(2/3): 213-223.

NAL Call Number: SF1 L5.

Keywords: husbandry, organic farming, feedlots, performance, economic analysis, costs, steers, farming systems, vaccination, creep feeding, feeds, maize, soybeans, hay, feed intake, live weight gain, live weight, feed conversion efficiency, backfat.

Fiems, L.O.; De Campeneere, S.; De Boever, J.L.; Vanacker, J.M. (2002). **Performance of double-muscled bulls affected by grazing or restricted indoor feed intake during the growing period followed by finishing up to two different slaughter weights.** *Livestock Production Science* 77 (1): 35-43, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: breed, Belgian Blue, bull, double-muscled, carcass composition, carcass quality, feed intake, feed restriction, growing period, growth rate, liveweight gain, maize silage, pasture grazing, slaughter, slaughter weight.

Forbes, J.M. (2002). **The multifactorial nature of food intake control.** *Journal of Dairy Science* 85 (Supplement 1):112, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: beef cattle, dairy cattle, sheep, digestive tract capacity, digestive system, rumen, climate, diet selection, digestion rate, discomfort, metabolism, nutritional value, social factors, voluntary feed intake.

French, P.; O'Riordan, E.G.; Moloney, A.P.; O'Kiely, P.; Caffrey, P.J. (2001). **Effects of concentrate level and grazing system on the performance of beef cattle grazing autumn herbage.** *Irish Journal of Agricultural and Food Research* 40(1): 33-44, ISSN: 0791-6833. **NAL Call Number:** S539.5 I74.

Keywords: Continental crossbred steers, cattle grazing systems, evaluation, growth rate improvement strategies, grazing, autumn grass, supplementation, concentrates, performance effects, grass intakes, grazing management strategies, carcass characteristics, final live weight, carcass weight, carcass conformation score, carcass fat score.

Fritsche, S.; Rumsey, T.S.; Yurawecz, M.P.; Ku, Y.; Fritsche, J. (2001). **Influence of growth promoting implants on fatty acid composition including conjugated linoleic acid isomers in beef fat.** *European Food Research and Technology* 212(6): 621-629.

NAL Call Number: TX341 Z45.

Keywords: beef steers, growth promoting implants, comparative study, Synovex (SYN), Ralgro (RAL), Revalor (REV), fatty acid compositions, conjugated linoleic acid (CLA), subcutaneous fat, intramuscular fat, lipids, analysis, liquid chromatography.

Galyean, M.L. (1996). **Protein levels in beef cattle finishing diets: industry application, university research, and systems results.** *Journal of Animal Science* 74(11):2860-70. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: finishing beef cattle, nutritionists, survey, diet formulation, crude protein, metabolizable protein, dry matter, feed bunk management, feed intake, performance, implant programs.

Galyean, M.L.; Perino, L.J.; Duff, G.C. (1999). **Interaction of cattle health/immunity and nutrition.** *Journal of Animal Science* 77(5): 1120-1134.

NAL Call Number: 49 J82.

Abstract: The usual means of assessing the health of newly received beef cattle susceptible to bovine respiratory disease (BRD) are subjective, typically involving visual evaluation aided by minimal clinical measurements. Recent evidence based on the occurrence of pneumonic lung lesions at slaughter indicates a need for more accurate methods of diagnosing BRD. Inadequate passive immune transfer at birth may be an important risk factor in susceptibility to BRD, suggesting the need for management to improve passive transfer success rates. Preweaning management and vaccination practices offer opportunities for beef cattle producers to improve the immune status of newly weaned calves and decrease postweaning BRD. Feeding diets with higher levels of concentrate typically improves performance by newly weaned or received cattle, as does feeding diets supplemented with protein; however, limited data suggest that increasing concentrate and protein in receiving diets increases the rate and severity of subjectively determined BRD morbidity. Research with receiving diet concentrate/protein level relative to humoral and cell-mediated immune function coupled with indicators of health and performance is needed. Supplemental B vitamins are sometimes useful in receiving diets, but the effects have been variable, presumably reflecting differences in stress and associated feed intake responses. Vitamin E added to receiving diets to supply

>(or)= 400 IU/animal daily seems beneficial for increasing gain and decreasing BRD morbidity; however, further dose titration experiments are needed. Supplemental Zn, Cu, Se, and Cr can alter immune function of newly received calves, and some field trials have shown decreases in BRD morbidity rate with supplementation; however, several experiments have shown no performance or health/immune benefits from supplementation of these trace minerals. Formulation of receiving diets should take into account decreased feed intake by highly stressed, newly received beef cattle and known nutrient deficiencies, but fortification of such diets with trace minerals beyond the levels needed to compensate for these effects is difficult to justify from present data.

Keywords: immune system, health, nutritional state, interactions, energy intake, dietary protein, nutrient intake, mineral nutrition, evaluation, clinical examination, lesions, respiratory diseases, risk factors, passive immunity, vaccination, weaning, calves, concentrates, performance, protein supplements, morbidity, vitamin supplements, stress, feed intake, vitamin E, vitamin B complex, live weight gain, dosage effects, zinc, copper, selenium, chromium, feed formulation, literature reviews.

Ganskopp, D.; Myers, B.; Lambert, S.; Cruz, R. (1997). **Preference and behavior of cattle grazing 8 varieties of grasses.** *Journal of Range Management* 50(6): 578-586.

NAL Call Number: 60.18 J82.

Abstract: We compared the forage preferences of steers grazing among 8 varieties of grasses at 2 stages of phenology on the Northern Great Basin Experimental Range near Burns, Ore. Varieties included: "Nordan" (*Agropyron desertorum* (Fischer ex Link)Schultes) and "CD-II" (*A. desertorum* X *A. cristatum* (L.) Gaertner) crested wheatgrass; "Magnar" and "Trailhead" Basin wildryes (*Leymus cinereus* (Scribner & Merrill) A. Love); "Goldar" bluebunch wheatgrass (*Pseudoroegneria spicata* (Pursh)A. Love); "Bozoisky-Select" Russian wildrye (*Psathyrostachys junceus* (Fischer) Nevski); "Bannock" thickspike wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus* (Scribner & J.G. Smith) Gould), and "Secar" Snake River wheatgrass (proposed nomenclature *Elymus lanceolatus* ssp. *wawawaiensis* (Scribner & J.G. Smith) Gould). Three esophageal-fistulated steers grazed each paddock, with 3 paddocks grazed at the boot stage of development, and 3 paddocks grazed after grasses entered quiescence. In boot-stage trials, steers were very selective and collectively harvested 53% of total bites from the preferred CD-II and Nordan. These crested wheatgrasses also ranked higher ($P < 0.05$) in bites visit and time/visit. Magnar, Trailhead, and Bozoisky-Select were avoided. When grasses were quiescent, steers were less selective; and CD-II, Nordan, Goldar, Bannock, and Bozoisky-Select were all equally acceptable. Magnar and Trailhead were again avoided. Steers consistently took more bites ($p < 0.05$) from preferred forages and regrazed preferred plants before any variety was depleted. Mean distance traveled between successive feeding stations was greater during bootstage trials (2.4 m) than at quiescence (1.4 m), suggesting steers searched among the nearest 48 neighboring plants in boot-stage trials and the nearest 24 neighbors during quiescence. Measures of grazing time per variety were strongly correlated ($r > 0.95$, $P < 0.01$) with total bites harvested from varieties and are probably adequate for ranking relative preferences of steers. By selectively grazing at both stages of phenology, cattle diets were higher in CP, P, and ADL than the standing crop. During boot-stage trials, diets were also higher in Ca and Mg than forage analyses would suggest. Except for phosphorus, the nutritive content of all varieties was satisfactory for lactating beef cattle at both stages of phenology. Given their proven ease of establishment, competitive ability, nutritional value, grazing tolerance, and high relative palatability, we

suggest the crested wheatgrasses (CD-II and Nordan), are excellent candidates for reclaiming or establishment of pastures for beef production programs in the northern Great Basin.

Keywords: steers, grazing, feeding preferences, *agropyron desertorum*, *leymus cinereus*, interspecific hybridization, *elymus spicatus*, *psathyrostachys juncea*, *elymus lanceolatus*, phenology, maturity stage, selective grazing, chemical composition, biting rates, plant height, leaf area index, moisture content, biomass, density, mineral content, crude protein, fiber content, in vitro digestibility, palatability, Oregon.

Garcia-Rodriguez, A.; Ramirez-Carrillo, J.T.; Rocha-Chavez, G.; Lezama-Gutierrez, R.; Gutierrez-Vazquez, E. (2002). **Nutritional quality of sun-dried swine excreta for beef cattle.** *Journal of Applied Animal Research* 22 (1): 105-112, ISSN: 0971-2119.

NAL Call Number: SF55 I4J68.

Keywords: breed, *Bos indicus* x Brown Swiss, feed intake, ground corn straws, sorghum straws, straw-excreta mixture, sun-dried swine excreta, animal acceptance, nutritional quality, weight gain.

Golda, J.; Kohoutek, A. (2002). **Utilization of grasslands by agrotechnical and management practices for efficient beef cattle and suckler cows husbandry.** [Vyuziti drnoveho pudniho fondu pratotechnickymi a pratoutilizacnimi postupy pro efektivni chov skotu bez trzni produkce mleka.] *Vyzkum v Chovu Skotu* 44(2): 17-18, ISSN: 0139-7265.

Abstract: This article summarizes the main objectives and stages of a project which aims to assess the utilization of pastures and permanent meadows by cattle in less favourable production areas in the Czech Republic. The project includes especially: 1) evaluation of different grass and clover mixtures, 2) assessment of optimal grass varieties in order to extend the grazing period, 3) evaluation of the effect of grazed grasslands on the landscape formation, 4) assessment of botanical diversity of permanent grasslands, 5) evaluation of different grazing methods, 6) monitoring cattle behaviour, 7) economical analyses.

Keywords: beef cattle, suckler cows, heifers, feed grasses, meadows, pasture improvement, grazing, soil amendments, yield factors, behavior, feeding habits, feeds, grasses, natural resources, nonrenewable resources, Czech language, Czech Republic.

Gomes, P.; Paulino, M.F.; Detmann, E.; Valadares, F.S.; Zervoudakis, J.T.; Lana, R. (2002). **Performance of growing crossbred steers supplemented during the dry season.** [Desempenho de novilhos mestiços na fase de crescimento suplementados durante a época seca.] *Revista Brasileira de Zootecnia* 31(1): 139-147, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: nutrition, *Brachiaria decumbens*, forage crop, beef cattle, average daily gain, feed, supplements, corn gluten meal, cottonseed meal, soybean meal, wheat bran, dry season, Portuguese language.

Goto, M. (2002). **Feeding effects of rice straw on digestion in the rumen of fattening beef cattle influenced by rice cropping methods.** *Grassland Science* 48 (4): 379-391, ISSN: 0447-5933.

NAL Call Number: 60.9 J27.

Keywords: beef cattle, fattening, silica, rice cropping methods, rice straw, rumen digestion, rice straw feeding, Japanese language, Japan.

Greene, L.W.; Chirase, N.K. (1998). **Influence of stocker program mineral nutrition on feedlot performance.** *Compendium on Continuing Education for the Practicing Veterinarian* 20(12): 1372-1379, ISSN: 0193-1903.

NAL Call Number: SF601 C66.

Keywords: feeder cattle, minerals, iron, cobalt, iodine, sodium, phosphorus, magnesium, calcium, potassium, manganese, selenium, copper, zinc, trace elements, nutrition, forage, composition, growth, nutrient requirements, mineral content, stress.

Greene, L.W. (1999). **Designing mineral supplements for beef cattle.** *Journal of Animal Science* 77(SUPPL. 1): 125, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: minerals, dietary supplementation, forage, based diet, pasture grazing.

Grundy, H.F.; Wheeler, K.P.A.; Hardy, R. (1996). **Rapeseed meal, maize-gluten feed and fish meal as protein supplements for maize silage given to growing/finishing Limousin Holstein Friesian bulls.** *Animal Science: An International Journal of Fundamental and Applied Research* 63(2): 223-228.

NAL Call Number: SF1 A56.

Keywords: proteins, supplements, bulls, cattle, weight gain, feed conversion efficiency, feed intake, weight, maize, gluten, fish meal, rapeseed meal, silage, animal feeding, byproducts, cereals.

Gutman, M.; Henkin, Z.; Holzer, Z.; Noy-Meir, I.; Seligman, N.G. (2000). **A case study of beef-cattle grazing in a Mediterranean-type woodland.** *Agroforestry Systems* 48 (2): 119-140, ISSN: 0167-4366.

NAL Call Number: SD387 M8A3.

Keywords: case studies, grazing, woodlands, beef cattle, scrub control, cattle feeding, controlled grazing, poultry manure, regrowth, stocking rate, thinning, silvopastoral systems, agroforestry systems, feed supplements, supplementary feeding, live weight, calving season, browsing, Israel.

Harapin, I.; Bauer, M.; Bedrica, L.; Potocnjak, D. (2000). **Correlation between glutathione peroxidase activity and the quantity of selenium in the whole blood of beef calves.** *Acta Veterinaria Brno* 69(2): 87- 92, ISSN: 0001-7213.

NAL Call Number: SF604 B7.

Keywords: beef calves, baseline data, glutathione peroxidase, antioxidant, whole blood, selenium, dietary supplement, whole blood.

Hartmann, J.; Schlichting, M.; Langholz, H.J. (1996). **Studies on improving beef testing systems on station. 2. Automation of feeding of standardized test diet.** [Untersuchungen zur Weiterentwicklung der Stationsprüfung auf Fleischleistung beim Rind. 2.

Automatisierung der Fütterung einer Standardprüfdiat] *Archiv für Tierzucht* 39 (2): 107-119, ISSN: 0003-9438.

NAL Call Number: 49 AR23.

Keywords: bulls, housing systems, automation, transponders, equipment, floors, straw, litter, slatted floors, behavior, feed intake, estimation, automatic feed dispensers, German language.

Hassoun, P. (2002). **Cattle feeding behaviour at pasture: A methodology related to on farm measurements.** *Animal Research* 51 (1): 35-41.

Abstract: In order to study the effects of herbage allowance on cattle behaviour activities on the farm, some methodological aspects had to be defined. Two sets of observations have been conducted on farm using a beef suckler herd containing 24 cows and managed in a rotational grazing system including a total of 6 paddocks. Behaviour activities were recorded on two successive paddocks. In set 1, the herd activities were recorded every 5 min in daylight and 15 min at night for the first two days on the two paddocks. In set 2, ten cows were individually identified among the same herd. On the first and the last day on the two paddocks, daylight activities were recorded with 5-min frequencies. From these individual observations, total grazing and ruminating duration were calculated, simulating records every 5, 10, 15 and 20 min. In set 1, 76% of the total grazing and 28% of the total ruminating activities occurred in daylight. Grazing started at dawn and finished at dusk. In set 2, grazing activity followed the same pattern as in set 1 in daylight. Whatever the frequency of the records, grazing and ruminating time were not significantly ($P > 0.05$) different. However the 10 min frequency gave fewer and lower individual differences than the 15 and 20 min frequencies, compared to the original record (5 min). It is concluded that visual observations of cattle managed in a rotational grazing system can be readily undertaken at the farm level with 5 to 20 min frequencies.

Keywords: feeding behavior, dark, daylight, pasture, rotational grazing, rumination.

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Hathaway, R.L.; Delcurto, T.; Carroll, D.J. (1997). **Improving economic efficiency by optimizing beef cattle winter feeding programs.** *Journal of Animal Science* 75 (SUPPL. 1): 108, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: winter feeding programs, improving economic efficiency, optimization, nutrition.

Heindl, U.; Schwarz, F.J.; Kirchgessner, M. (1996). **Prediction of feed intake by beef cattle.** *Zuechtungskunde* 68(5): 357-368, ISSN: 0044-5401.

NAL Call Number: 49 Z8

Keywords: daily weight gain, dry matter, energy, feed intake, forage intake, German Simmental cow, grass silage, hay, maize silage, nutrition, German language.

Herring, A.D.; Larremore, M.B.; Hughes, L.J.; Richardson, C.R. (2000). **Effects of a commercial direct-fed microbial on weight change, milk yield, and milk composition in lactating beef cows: a case study.** *The Professional Animal Scientists* 16(1): 54-58. Online version: <http://www.arpas.uiuc.edu/pas/pas.html>

NAL Call Number: SF51 P76.

Keywords: beef cows, lactation, probiotics, *saccharomyces cerevisiae*, *streptococcus faecium*, *lactobacillus acidophilus*, enzyme preparations, alpha-amylase, beta-glucanase, milk yield, lactation stage, milk fat percentage, milk protein percentage, somatic cell count, body weight, live weight gain, calves, weaning weight.

Hickey, M.C.; French, P.; Grant, J. (2002). **Out-wintering pads for finishing beef cattle: animal production and welfare.** *Animal Science: An International Journal of Fundamental and Applied Research* 75 (3): 447-458, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Abstract: The objective of this experiment was to evaluate the performance and well being of animals accommodated outdoors over the winter period on out-wintering pads (OWPs),

relative to animals housed indoors in conventional slatted sheds. One hundred and twenty-six steers were assigned at random to one of seven treatments. The first six treatments were accommodated on OWPs. These six treatments were arranged in a three (6, 12 and 18 m² per head space allowance) by two (wind sheltered or exposed) factorial design. A seventh treatment group (control) was housed indoors in a slatted-floor shed at a space allowance of 3 m² per head. All animals were offered silage ad libitum and 5 kg concentrate per day. All animals were slaughtered at the end of the 151 day experiment. Animal production and indices (climatic energy demand (CED), behaviour, cleanliness, hoof condition and immune function) of animal welfare were evaluated. There was no significant effect of stocking density outdoors or sheltering on liveweight gain, carcass gain, fat score, fat score per 100 kg carcass, kidney plus channel fat (KCF) as a proportion of carcass, carcass conformation score, killing-out proportion, food intake or food efficiency. Relative to animals housed indoors on slats, animals accommodated outdoors on OWPs had higher daily liveweight gain ($P<0.001$), carcass gain ($P<0.05$), and food intake ($P<0.05$). However, animals on the OWPs had less KCF per kg carcass and lower fat scores per 100 kg carcass. There was no effect of shelter on the CED of animals out-wintered, which was higher ($P<0.001$) than their counterparts wintered indoors on slats. Animals housed on slats were cleaner than animals housed at 6 or 12 m² per head ($P<0.05$) but not 18 m² per head. There was no effect of treatment on physiological measures. Animals confined on the OWP with or without shelter, had a greater number of lying bouts per 24 h ($P<0.076$), had a greater synchronized lying frequency ($P<0.082$) and displayed less hesitation prior to lying when compared with animals housed on slats. Indoor animals had more white line disease ($P<0.01$) and under-run ($P<0.001$) on their front hoof, when compared with outdoor animals. Animals accommodated outdoors at 18 m² per head had more ($P<0.05$) claw erosion while the indoor animals had a greater ($P<0.001$) degree of under-run present on their hind hoof. There was no evidence to suggest that out-wintering compromised animal welfare. Further studies are required to determine the reason for the increased carcass growth and leanness of the cattle on the OWPs. many ref.

Keywords: housing, animal welfare, beef cattle, carcass composition, carcass quality, feed intake, hooves, liveweight gain, physical activity, steers, winter. CAB International.

Hill, G.M.; et al (2002). **Peanut by-products fed to cattle.** *Veterinary Clinics of North America. Food Animal Practice* 18 (2): 295-315, ISSN: 0749-0720.

NAL Call Number: SF601 V535.

Keywords: feeding, feedstuffs, peanut hulls, by-product, adverse effects, tannins, dietary fiber, protein, economics.

Huber, J.T. (1997). **Probiotics in cattle.** In: *Probiotics 2: Applications and Practical Aspects*, R. Fuller (ed.), Chapman and Hall Ltd: London, United Kingdom, pp. 162-186, ISBN: 0-412-73610-1.

NAL Call Number: QR171.16 P76 1997.

Keywords: beef cattle, calves, lactobacillus, streptococcus, aspergillus, deuteromycotina, bacteria, fungi, lactation, supplements, probiotics, milk production, feed intake, milk yield, animal feeding, animal performance, animal production, behavior.

Ingrand, S.; Agabriel, J.; Dedieu, B.; Lassalas, J. (2001). **Effects of reducing access to food on intake and feeding behaviour of loose-housed dry Charolais cows.** *Animal Research* 50(2): 145-148.

Keywords: Charolais cows, breed, food intake, feeding behavior, hay ad libitum, feeding from mangers, nutritional requirements.

Ingrand, S.; Agabriel, J.; Lassalas, J. (1997). **Individual feeding vs group feeding for Charolais cows. [Comportement d'ingestion de vaches Charolaises conduites a l'attache ou en stabulation libre.]** In: *Proceedings of the 4. meeting "Rencontres autour des recherches sur les ruminants". Paris (France), December 4 and 5 1997 [4. Rencontres autour des recherches sur les ruminants. Paris (France), les 4 et 5 decembre 1997]* Institut de l'Elevage: Paris, France, p.91, ISBN: 2-84148-026-7.

Keywords: cows, housing, tethered stalls, hay, feed intake, feeding habits, feeds, husbandry methods, behavior, French language, France.

Jannasch, R.W.; Charmley, E.; Rodd, A.V. (2002). **The effect of spring turnout date on weight gain by cattle on native pasture.** *Canadian Journal of Animal Science* 82 (4): 575-585, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: Hereford, breed, acid detergent fiber, crude protein, neutral detergent fiber, body weight gain, forage quality, growth performance, herbage mass, native pasture grazing, soil compaction, spring turnout date, effect.

Jannasch, R.; Charmley, E. (2000). **The effect of early and late turnout on weight loss by feeder cattle on spring pasture.** *Canadian Journal of Animal Science* 80(4): 759-760, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: feeder cattle, nutrition, early turnout, forage biomass, forage quality, late turnout, spring pasture, weight gain, weight loss.

Jones, S.D.M.; Beauchemin, K.; Rode, L.; Jeremiah, L.E. (1997). **The effects of feeding barley or corn on the carcass quality of beef cattle.** *Canadian Journal of Animal Science* 77 (3): 562, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: barley, corn, animal feed, carcass quality, animal feed, dressing yield, meat, color.

Jouany, J.P.; Michalet, D.B.; Doreau, M. (2000). **Manipulation of the rumen ecosystem to support high, performance beef cattle: Review.** *Asian, Australasian Journal of Animal Sciences* 13 (1): 96-114, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: beef cattle, high, performance, genetic selection, rumen bacteria, rumen protozoa, high energy diets, amino acid supply, carcass quality, diet composition, feed additives, feed energy value, high, energy diet, complications, lipid supplementation, meat quality, protein supply, rumen ecosystem, manipulation, rumen microbial protein synthesis, rumen acidosis, starch digestion.

Kamphues, J. (1999). **Antibiotic growth promoters for the view of animal nutrition.** *Berliner und Munchener tierarztliche Wochenschrift* 112(10-11): 370-9.

NAL Call Number: 41.8 B45.

Keywords: antibiotic growth promoter ban, alternatives, feed additives, bacterial resistance, pathogenic bacteria, therapeutics olaquinox, zinc oxide, copper, weaning problems, E.coli infection, legislation, review, Sweden, Germany, German language.

Karn, J.F. (2001). **Phosphorus nutrition of grazing cattle: A review.** *Animal Feed Science and Technology* 89(3-4): 133-153, ISSN: 0377-8401.

NAL Call Number: SF95 A55.

Keywords: grazing cattle, phosphorus deficiency, nutritional disease, dietary intake, homeostasis, nutritional requirements, skeletal reserves, status indicators, supplements.

Katepa-Mupondwa, F., Singh, A., Smith, S.R.Jr.; McCaughey, W.P. (2002). **Grazing tolerance of alfalfa (*Medicago* spp.) under continuous and rotational stocking systems in pure stands and in mixture with meadow brome grass (*Bromus riparius* Rehm. syn. *B. biebersteinii* Roem & Schult).** *Canadian Journal of Plant Science* 82 (2): 337-347, ISSN: 0008-4220.

NAL Call Number: 450 C16.

Keywords: beef cattle, grazing, *Bromus riparius*, meadow brome grass, forage crop, alfalfa, grazing tolerance, mixed stands, pure stands, continuous stocking system, field method, rotational stocking system, Western Canada.

Kilimaru, S. (1996). ***The Intensive Growing and Feeding of Beef Bulls. [Cresterea Intensiva Si Ingrasarea Taurinelor Pentru Carne.]*** Institute of Technical and Economical Information: Kishinev, Republic of Moldova, 30p.

Keywords: bulls, animal feeding, Romanian language, Republic of Moldova.

Kirkpatrick, D.E.; Steen, R.W.J.; Unsworth, E.F. (1997). **The effect of differing forage: Concentrate ratio and restricting feed intake on the energy and nitrogen utilization by beef cattle.** *Livestock Production Science* 51 (1, 3): 151-164, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: steers, Charolais, breed, nitrogen utilization, energy intake, energy utilization, feed intake, forage/concentrate ratio, grass silage, animal feed, high digestibility diet, low digestibility silage.

Koster, H. (May 1998). **Licks for optimal beef production. Part 1.** *Farmer's Weekly* pp. 12-16.

NAL Call Number: 24 F225.

Keywords: body condition, supplementary feeding, nutritional requirements, proteins, wintering, South Africa.

Koster, H. (May 1998). **Licks for optimal beef production. Part 2.** *Farmer's Weekly* pp. 16-19.

NAL Call Number: 24 F225.

Keywords: supplementary feeding, nutritional requirements, proteins, urea, South Africa.

Kvapilík, J. (1996). **Pasture feeding of bulls, bullocks and heifers. [Pastevní vykrm byčku, volku a jalovic.]** *Vyzkum v Chovu Skotu* 38(1): 2-7, ISSN: 0139-7265.

Keywords: beef cattle bulls, bullocks, heifers, grazing systems, fattening, feed intake, weight gain, slaughter weight, carcass composition, prices, costs, Germany, France, Ireland, Czech language.

Laborde, F.L.; Mandell, I.B.; Tosh, J.J.; Buchanan-Smith, J.G.; Wilton, J.W. (2002). **Effect of management strategy on growth performance, carcass characteristics, fatty acid composition, and palatability attributes in crossbred steers.** *Canadian Journal of Animal Science* 82 (1): 49-57. ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Abstract: Crossbred steers (n = 136) were used to evaluate the effect of management strategy on growth performance, carcass characteristics, and fatty acid composition and palatability attributes of beef. Management strategies included: (1) high grain (75% high moisture corn) finishing (HG), or (2) backgrounding with restricted feeding of an alfalfa silage ration for 112 d, followed by HG until slaughter (BKG). Steers were slaughtered at 8-10 mm ultrasound backfat. Backgrounding increased ($P < 0.001$) days on feed and decreased ($P < 0.01$) days on grain, average daily gain and longissimus muscle area compared with the HG regime. Slaughter weight, intramuscular fat content, and marbling score were unaffected ($P > 0.10$) by management strategy. Longissimus muscle palatability attributes and shear force did not differ ($P > 0.10$) between management strategies, whereas BKG increased ($P < 0.03$) softness, overall tenderness, chewiness, and rate of breakdown scores, and decreased ($P < 0.09$) juiciness scores in semitendinosus muscle. Backgrounding increased ($P < 0.05$) conjugated linoleic acid (CLA), total monounsaturated fatty acids, and omega3 polyunsaturated fatty acid (PUFA), and decreased ($P < 0.05$) total saturated fatty acids (SFA), and omega6 PUFA content of beef. While the change in quantitative and qualitative fatty acid composition of beef is in line with current dietary recommendations for humans, the magnitude of these changes was minimal.

Keywords: beef cattle, steers, animal husbandry, growth, performance, carcass composition, fatty acids, palatability, crossbreds, meat quality, feeds, finishing, silage, backfat, fat thickness, liveweight gain, muscles, slaughter weight, leanness, tenderness, flavor, moisture content.

Laliberte, A.S.; Gardner, W.G.; Popp, J.D.; Quinton, D.A.; Mir, Z.; Mir, P.S.; Buckley, W.T. (1997). **The distribution of molybdenum and copper in the tissues and organs of yearling beef cattle backgrounded on a molybdenum, enriched diet.** *Canadian Journal of Animal Science* 77 (3): 552, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: breed, Hereford x Angus, yearling, blood, blood and lymphatics, bone, skeletal system, heart, circulatory system, hide, kidney, excretory system, liver, digestive system, muscle, muscular system, cadmium, tissue distribution, copper, tissue distribution, lead, tissue distribution, mercury, tissue distribution, molybdenum, tissue distribution, fat, molybdenum, enriched diet.

Lana, R. de P. (2002). **A system of feed supplementation for beef cattle under grazing. Simulation [Sistema de suplementacao alimentar para bovinos de corte em pastejo. Simulacao.]** *Revista Brasileira de Zootecnia* 31(1): 223-231, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: feed intake, supplements, pastures, diet, weight, behavior, feeding habits, grazing lands, land resources, natural resources, nonrenewable resources, Portuguese language, Brazil.

Lana, R. de P.; Gomes Junior, P. (2002). **A system of feed supplementation for beef cattle under grazing. Validation [Sistema de suplementa o alimentar para bovinos de corte em pastejo. Valida o.]** *Revista Brasileira de Zootecnia* 31(1) Suppl.: 451-459, ISSN: 1516-3598. **NAL Call Number:** SF1 R45.

Keywords: beef cattle, supplements, feed intake, pastures, urea, weight gain, grazing, amides, behaviour, feeding habits, grazing lands, land resources, natural resources, nonrenewable resources, ruminants, Portuguese language, Brazil.

Larson, E.M.; Johnson, D.E. (1998). **Predicting net energy of feedstuffs for beef cattle.** In: *Energy Metabolism of Farm Animals*, McCracken K.J., Unsworth E.F., Wylie A.R.G. (eds.), CAB International: Wallingford, England, UK, pp. 355-358, ISBN: 0-85199-276-5. **NAL Call Number:** SF94.6 S95 1997.

Keywords: dietary aspects, feed evaluation, feedstuff net energy, prediction.

Le Guevel, R.; Pakdel, F. (2001). **Assessment of oestrogenic potency of chemicals used as growth promoter by in-vitro methods.** *Human Reproduction (Oxford)* 16(5): 1030-1036, ISSN: 0268-1161.

Keywords: in-vitro bioassays, comparative study, estrogenic potency of chemicals used as growth promoters, beef cattle production in Non-European Union countries, 17beta-estradiol, alpha-zearalanol, testosterone, trenbolone, trenbolone acetate, melengestrol acetate, food contaminant, mycotoxin zearalenone, 17alpha-estradiol, estrone, 17alpha-epitestosterone, 19-nortestosterone, androstendione, zearalanone, alpha-zearalanol, beta-zearalanol, alpha-zearalenol, beta-zearalenol dd, alkaline phosphatase gene induction, estrogens in the human endometrial Ishikawa cell line.

Loerch, S.C. (1996). **Limit, feeding corn as an alternative to hay for gestating beef cows.** *Journal of Animal Science* 74 (6): 1211-1216, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Simmental crossbred cows, breed, limit feeding, corn based diets, supplementation, monensin, alternatives to hay, reproductive performance, conception rate, calf weaning weight.

Lowman, B. (1997). **Grass height for beef cattle.** *Cattle Practice* 5 (1): 44, ISSN: 0969-1251.

NAL Call Number: SF961 C37.

Keywords: grazing, height, plant height, feeding behavior.

Lowman, B.G.; Hinks, C.E.; Hunter, E.A.; Scott, N.A. (1996). **Effect of breed type, sex, method of rearing and winter nutrition on lifetime performance and carcass composition in a 20-month beef system: grazing performance.** *Animal Science: An International Journal of Fundamental and Applied Research* 63(2): 215-222.

NAL Call Number: SF1 A56.

Keywords: grazing, winter, cattle suckling, males, females, body condition, pastures height, weight gain, sex, biological differences, feeding level.

Lowman, B.G.; Lewis, M. (1996). **Feeding and management of intensively reared bulls: conventional compared with organic.** In: *Recent Developments in Ruminant Nutrition 3. Feeding and Management of Intensively Reared Bulls: Conventional Compared with Organic*, P.C. Garnsworthy and D.J.A. Cole (eds.), Nottingham University Press: Loughborough, United Kingdom, pp. 279-307, ISBN: 1-897676-42-5.
NAL Call Number: SF95 R463 1996.

Keywords: feeding, management, grazing, organic agriculture, silage, beef, meat production, bulls, alternative agriculture, United Kingdom.

Luppi, A.; Gilioli, G. (2000). **Plans for the control of anabolic substances in beef.** [Piani di autocontrollo nella filiera delle carni bovine.] *Obiettivi e Documenti Veterinari* 21(12): 15-18, ISSN: 0392-1913.

Keywords: legislation, abattoirs, animal production, housing, feeding, anabolics, residues, slaughter, beef quality, meat quality, meat production, carcasses, Italian language, Italy.

Mader, T.L.; Holt, S.M.; Hahn, G.L.; Davis, M.S.; Spiers, D.E. (2002). **Feeding strategies for managing heat load in feedlot cattle.** *Journal of Animal Science* 80 (9): 2373-2382, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: feeding, environmental effect, feedlot, body temperature, food intake, energy metabolism, experimental study, restricted feeding, heat stress.

Manterola, B.H.; Cerda, D.; et al. (1997). **Study of the productive behavior and ruminal parameter variations in steers fed different levels of grape marc.** [Estudio del comportamiento productivo y variacion de parametros ruminales en novillos alimentados con niveles crecientes de orujo de uva.] *Avances en Produccion Animal* 22(1-2): 71-80, ISSN: 0378-4509.

NAL Call Number: SF1 A9.

Keywords: beef cattle, breed, Hereford, fattening, diet, byproducts, wine industry, rumen, digestion, degradation, weight gain, feed conversion efficiency, carcass composition, Spanish language, Chile.

Manzano, R.P. (2002). **Intake, digestive parameters and behavior of beef steers on Tanzania grass (*Panicum maximum* Jacq. cv. Tanzania) pasture, supplemented with energy or protein sources** [Consumo, par metros digestivos e comportamento de bovinos de corte em pastejo de capim Tanz nia (*Panicum maximum* Jacq. cv Tanz nia) suplementados com fontes de energia ou de prote na] Escola Superior de Agricultura Luiz de Queiroz, Piracicaba, SP (Brazil), 160p.

Keywords: beef cattle, panicum maximum, supplements, pastures, digestibility, feed consumption, animal performance, consumption, grazing lands, land resources, natural resources, nonrenewable resources, Portuguese language, Brazil.

Marcal, W.S.; Gaste, L.; Liboni, M.; Pardo, P.E.; Do Nascimento, M.R.; Hisasi, C.S. (1999). **Lead concentration in mineral salt mixtures used in beef cattle food supplementation in Brazil.** *Veterinarski Arhiv* 69 (6): 349-355, ISSN: 0372-5480.

NAL Call Number: 41.8 V6416.

Keywords: toxicity, lead concentrations, salt formulations, spectrophotometric technique, atomic plasma induction, Brazil

Marongiu, M.L.; Molle, G.; San Juan, L.; Bomboi, G.; Ligios, C.; Sanna, A.; Casu, S.; Diskin, M. G. (2002). **Effects of feeding level before and after calving, and restricted suckling frequency on postpartum reproductive and productive performance of Sarda and Charolais X Sarda beef cows.** *Livestock Production Science* 77 (2-3): 339-348, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: breed, Sarda, Charolais, body condition score, calving, conception rate, feeding level, genotype, postpartum anestrus interval, postpartum reproductive performance, suckling frequency, Sardinia, Italy.

Martin, O.S.M.; Balcells, J.; Vicente, F.; Castrillo, C. (2000). **Influence of dietary rumen, degradable protein supply on rumen characteristics and carbohydrate fermentation in beef cattle offered high, grain diets.** *Animal Feed Science and Technology* 88(1, 2): 59-77, ISSN: 0377-8401.

NAL Call Number: SF95 A55

Keywords: crossbred Holstein, Friesian heifers, fitted with rumen and duodenal cannulae dietary treatments, barley straw, concentrate, barley, corn, urea, casein, rumen microbial yield, rumen ammonia, arabinose, digestibility, carbohydrate, fermentation, cellulose, glucose.

Masbulan, E.; Priyanto, D.; Priyanti, A.; Haryanto, B. (1999). **Integration of beef cattle rearing on rice farming system in IP-300 areas in Yogyakarta (Indonesia).** [Integrasi usaha sapi potong dalam sistem usahatani padi di kawasan IP 300 Daerah Istimewa Yogyakarta.] In: *Guide Book for National Seminar on Animal Husbandry and Veterinary. [Buku Panduan Seminar Nasional Peternakan Dan Veteriner.]* Puslitbangnak: Bogor, Indonesia, p. 61.

Keywords: integration, fattening, farming systems, oryza sativa, rice straw, feeds, composts, java, agricultural wastes, animal wastes, animal feeding, crop residues, gramineae, oryza, ruminants, straw, Indonesian language, Indonesia.

McIntosh, F. (2000). **Developing a beef cattle nutritional management education package for producers in northern Australia.** *Asian, Australasian Journal of Animal Sciences* 13(Supplement Vol. B): 170-173, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: beef producers, farmer training, marketing processing, nutritional management, producer education packages.

McNamee, B.F.; Kilpatrick, D.J.; Steen, R.W.J.; Gordon, F.J. (2001). **The prediction of grass silage intake by beef cattle receiving barley, based supplements.** *Livestock Production Science* 68(1): 25-30, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: ad libitum feed, dry matter intake, grass silage model, mathematical model, barley, feed concentrate, dry matter intake, grass silage, intake prediction

Miettinen, P. (1996). **Effects of nutrition of reproduction (fertility and infertility) of dairy and beef cattle.** *Bovine Practitioner* 30: 62-66, ISSN: 0524-1685.

NAL Call Number: SF779.5 A1B6.

Keywords: breeding, dairy production, energy metabolism, feed efficiency, feeding, fertility, infertility, meeting paper, nutrition, reproduction.

Mir, P.S.; Bailey, D.R.C.; Mir, Z.; Jones, S.D.M.; Entz, T.; Husar, S.D.; Shannon, N.H.; Robertson, W.M. (1997). **Effect of feeding barley based diets on animal performance, carcass characteristics and meat quality of crossbred beef cattle with and without Wagyu genetics.** *Canadian Journal of Animal Science* 77 (4): 655-662, ISSN: 0008-3984. NAL Call Number: 41.8 C163.

Keywords: heifers, steers, Wagyu, breed, crossbred, growth performance, carcass characteristics, meat quality, marbling grade, barley, based diets, carcass characteristics.

Moore, K.M.; Barry, T.N.; Cameron, P.N.; Lopez-Villalobos, N.; Cameron, D.J. (2003). **Willow (*Salix* sp.) as a supplement for grazing cattle under drought conditions.** *Animal Feed Science and Technology* 104 (1-4):1-11, ISSN: 0377-8401. NAL Call Number: SF95 A55.

Keywords: willow supplementation, dry pasture, dead matter content, drought conditions, dry matter content, liveweight, metabolizable energy content, feed, chemical composition, dietary supplement, nutritive value, New Zealand.

Motonaga, T.; Ikuta, M. (1996). **Techniques of feeding management for multiple birth on diversified farming for milk and beef, 1: Technique and milk replacer for Japanese black twins calves.** *Bulletin of the Zootechnical Experiment Station - Prefecture of Yamaguchi* (12): 1-12, ISSN: 0287-1262.

Keywords: cows, calves, multiple births, milk replacers, feed intake, growth, behavior, development, feeding habits, feeds, livestock, pregnancy, reproduction, Japanese language.

Mount, M.E.; Cullor, J.S.; Kass, P.H.; Garret, W. (1996). **Monensin concentrations measured in feeder cattle using enzyme immunoassay.** *Veterinary and Human Toxicology* 38 (3): 169-172, ISSN: 0145-6296. NAL Call Number: SF601 A47.

Keywords: heifers, growth promoter, monensin, enzyme immunoassay, fecal, urinary, seral samples.

Muir, P.D.; Deaker, J.M.; Bown, M.D. (1998). **Effects of forage, and grain, based feeding systems of beef quality: A review.** *New Zealand Journal of Agricultural Research* 41 (4): 623-635, ISSN: 0028-8233. NAL Call Number: 23 N4892.

Keywords: beef, fat color, flavor, marbling, juiciness, meat, meat color, tenderness, quality, finishing, forage based feeding system, grain based feeding system, literature review, New Zealand.

Murphy, M.D.; Coulter, B.S.; Noonan, D.G.; Connolly, J. (2002). **The effect of sulphur fertilisation on grass growth and animal performance.** *Irish Journal of Agricultural and Food Research* 41 (1): 1-15, ISSN: 0791-6833. NAL Call Number: S539.5 I74.

Keywords: grass, forage crop, growth studies, livestock performance studies, copper analysis, blood level studies, molybdenum, sulfur, biological effects, deficiency effects,

fertilization effects, nutrients, Irish grassland study, grazing, animal performance study, Ireland.

Mustafa, A.F.; McKinnon, J.J.; Christensen, D.A. (2001). **Effects of feeding ensiled spearmint (*Mentha spicata*) byproduct on nutrient utilization and ruminal fermentation of steers.** *Animal Feed Science and Technology* 92(1-2): 33-43, ISSN: 0377-8401.

NAL Call Number: SF95 A55.

Keywords: steers, feeding, byproduct, ensiled spearmint, barley silage, comparison, fistulated steers, ruminal fermentation, nutrient utilization, neutral detergent fiber (NDF), acid detergent lignin (ADL), crude protein (CP), acid detergent insoluble protein, volatile fatty acids (VFA), dry matter, average daily gain, digestible energy content .

Myer, R.O., Blount, A.R. (2002). **Influence of forage blend and cultivation method on cool season forage availability for grazing by beef cattle.** *Journal of Animal Science* 80 (Supplement 2): 2, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef heifer, beef steer, overseeding cultivation, cultivation method, prepared seedbed cultivation, dry matter yield, bahiagrass, cool season grazing, forage blend, oats, rye, ryegrass.

National Research Council (2000). *Nutrient Requirements of Beef Cattle: Update 2000* National Academy Press: Washington, USA, 8th edition, 232 p., ISBN: 0-309-06934-3.

Keywords: nutrient requirements, beef cattle, reproduction, computer software , cattle management, environmental conditions, energy, protein, growth and body reserves, reproduction, minerals, vitamins and water, feed intake, implications of stress.

Nelson, M.L.; Busboom, J.R.; Cronrath, J.D.; Falen, L.; Blankenbaker, A. (2000). **Effects of graded levels of potato by-products in barley- and corn-based beef feedlot diets: I. Feedlot performance, carcass traits, meat composition, and appearance.** *Journal of Animal Science* 78(7): 1829-1836, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: crossbred beef steers, diet, barley, corn, potato by-product, feedlot performance, carcass characteristics, beef appearance, meat composition.

Nockels, C.F.; Odde, K.G.; Craig, A.M. (1996). **Vitamin E supplementation and stress affect tissue alpha-tocopherol content of beef heifers.** *Journal of Animal Science* 74(3): 672-677.

NAL Call Number: 49 J82.

Abstract: The effect of stress on tissue alpha-tocopherol was investigated in 16 crossbred heifers fed a corn/corn silage-based diet. For 28 d, eight heifers (379 +/- 10 kg BW) received a dietary supplement of 1,000 IU of dl-alpha-tocopheryl acetate, whereas the controls (375 +/- 10 kg BW) received no supplemental vitamin E. Tissue samples of plasma, red blood cells, liver, trapezius, and longissimus muscles and subcutaneous fat immediately dorsal to each muscle were taken on d 1 for determination of alpha-tocopherol concentration. On d 2 through 4 each heifer was restricted to 2.61 kg of grass hay and allowed water. On d 5, 6, and 7 no feed or water was given, 100 IU of ACTH and .0024 mg of epinephrine/kg BW were given every 8 h, and biopsies for alpha-tocopherol content were again taken on d 7. The stress reduced ($P < .01$) mean BW, increased ($P < .01$) serum cortisol, creatine kinase, and urea. After stress, supplemental vitamin E reduced ($P < .13$) the increase in creatine kinase

relative to that in heifers not supplemented with vitamin E. Stress also increased ($P < .04$) serum Se in heifers fortified with the vitamin E. Alpha-tocopherol content of plasma, red blood cells, liver, and subcutaneous fat dorsal to the trapezius muscle was increased ($P < .01$) by supplemental vitamin E. The stress treatment reduced ($P < .01$) alpha-tocopherol content of plasma in those fed the vitamin E and increased it ($P < .05$) in the nonsupplemented vitamin E-deficient heifers. Stress also decreased red blood cell ($P < .01$) and liver ($P < .05$) alpha-tocopherol content in cattle supplemented with vitamin E. Tissue alpha-tocopherol concentrations were reduced by stress only when a diet adequate in vitamin E was fed. In addition, in most sampled tissues, stress did not affect alpha-tocopherol concentrations.

Keywords: beef cattle, heifers, alpha-tocopherol, stress response, vitamin e acetate, water deprivation, restricted feeding, blood serum, selenium, urea, erythrocytes, hydrocortisone, liver, muscle tissue, adipose tissue, creatine kinase, maize, maize silage.

Nogueira, E.; Morais, M.G.; Costa e Silva, E.V.; Andrade, V.J.; Brito, A.T. (2001). **Effect of creep-feeding calves on weight and pregnancy rate of primiparous beef heifers with low body condition.** [Efeito da suplementacao de bezerros em creep-feeding sobre o peso e taxa de gestacao de primiparas Nelore com baixo escore corporal.] *Revista Brasileira de Reproducao Animal* 25(2): 223-224, ISSN: 0102-0803.

NAL Call Number: QP251 R48.

Keywords: calves, weaning weight, gestation rate, creep-feeding, body condition score, Brazil, Portuguese language.

Nussbaum, A.; Schiessler, G.; Hammon, H.M.; Blum, J.W. (2002). **Growth performance and metabolic and endocrine traits in calves pair-fed by bucket or by automate starting in the neonatal period.** *Journal of Animal Science* 80 (6):1545-1555, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: calf, neonate, hormones, metabolites, automate starting feeding, bucket pair-feeding, endocrine traits, feeding frequency, growth, growth performance, metabolic traits.

Okine, E.; Basarab, J.A.; Baron, V.; Price, M.A. (2002). **Methane and manure production in cattle with different net feed intakes.** *Journal of Dairy Science* 85 (Supplement 1): 206, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: barley, manure, methane production, nitrogen, potassium, dry matter intake, net feed intake, silage.

Olson, B. (2002). **Orientation of beef cattle grazing foothill winter range in Montana.** *Journal of Dairy Science* 85 (Supplement 1): 81, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: ambient weather, body orientation, foothill winter range, grazing, relative humidity, seasonality, solar radiation, Montana, USA.

Oltjen, J.W.; Sainz, R.D. (1997). **Strategic supplementation of range beef cows: Split feeding by body condition and stocking rate.** *Journal of Animal Science* 75 (SUPPL. 1): 250, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: calf, cow, range beef cattle body condition, calving body condition score, grazing intensity, stocking rate, strategic supplementation, nutritional strategy, split feeding.

Opitz von Boberfeld, W (2000). **Outdoor stock keeping of suckler cows during winter under the aspects of environment and forage foundation.** [Caloroczne bezbudynkowe utrzymanie krow-matek miesnych z uwzglednieniem aspektow ochrony srodowiska i gospodarki paszowej.] *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 375(24): 27-37, ISSN: 1232-3071.

Keywords: animal feeding, pastures, grazing, grazing systems, grassland soils, wintering, silage, feed processing, quality, silage, making, nutrients, *Lolium perenne*, *Festuca arundinacea*, cultural soil types, ecological soil types, Germany.

Owens, F.N.; Secrist, D.S.; Hill, W.J.; Gill, D.R. (1997). **The effect of grain source and grain processing on performance of feedlot cattle: a review.** *Journal of Animal Science* 75(3): 868-79. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: effects of grain species, grain processing, dry matter intake, rate and efficiency of gain, high concentrate diets, metabolizable energy (ME), high moisture corn and milo, steam-flaked corn or wheat.

Papstein, H.J.; Losand, B.; Gabel, M.; Ender, K. (1999). **Investigations on growth of intensively fed male and female beef cattle twins and singles: 1st communication: live weight growth and feed conversion.** *Zuechtungskunde* 71 (3): 168-181, ISSN: 0044-5401.

NAL Call Number: 49 Z8

Keywords: bulls, heifers, effects of, birth type, sex of twin partners, age, live weight growth, energy expenditure, live weight gain, German language.

Parwati, I.A.; Suyasa, NYM; Guntoro, S.; Yasa, MD.R (1999). **Effect of probiotic and puncture laser application on body weight increase of Bali cattle.** [Pengaruh pemberian probiotik dan laser punktur dalam meningkatkan berat badan sapi Bali.] In: *Guide Book for National Seminar on Animal Husbandry and Veterinary.* [Buku Panduan Seminar Nasional Peternakan Dan Veteriner.] Puslitbangnak: Bogor, Indonesia, pp. 14-15.

Keywords: probiotics, laser radiation, body weight, fattening, animal feeding, Indonesian language, Indonesia.

Pascoal, L.L.; Eifert, E.C. da; Restle, J. (2000). **Level of crude protein for beef calves weaned at 66 days of age.** [Nivel de proteina bruta para bezerros de corte desmamados aos 66 dias de idade.] *Revista Brasileira de Zootecnia* 29(5): 1537-1544, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: cattle feeding, young animals, Braford, breed, protein intake, feed intake, feed conversion efficiency, Portuguese language.

Perotto, D.; Moletta, J.L.; Oliveira, J.E.P. de; Lesskui, C. (2000). **Feed intake and feed:gain ratio of Charolais, Caracu and reciprocal crossbred males in finished in feedlot.** [Consumo e conversao alimentar de machos bovinos inteiros Charoles, Caracu e cruzamentos reciprocos em confinamento.] *Revista Brasileira de Zootecnia* 29(1): 108-116, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: feed intake, feedlots, diet, weight gain, crossbreeding , behavior, breeding methods, Portuguese language, Brazil.

Phillips, W.A.; Brown, M.A.; Holloway, J.W.; Mayeux, H.S. (2002). **Animal performance and carcass quality of stocker calves on grass pasture with ad libitum access to a high energy diet.** *Journal of Dairy Science* 85 (Supplement 1): 228, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: beef cattle, stocker calf, wheat , forage crop, average daily gain, carcass quality, feedlot, pasture grazing, stocking rate, Texas, USA.

Ponter, A.A.; Douar, C.; Mialot, J.; Benoit, P.; Valiergue, H.; Grimard, B. (2000). **Effect of underfeeding post, partum Charolais beef cows on composition of plasma non, esterified fatty acids.** *Animal Science: An International Journal of Fundamental and Applied Research* 71(2): 243-252, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Keywords: Charolais, breed, beef cows, female blood, lymphatics, milk, reproductive system, non, esterified fatty acids, oleic acid, restricted diet, nutritional method, body weight, underfeeding, condition score.

Popp, J.D.; McCaughey, W.P.; Cohen, R.D.H. (1997). **Effect of grazing system, stocking rate and season of use on herbage intake and grazing behaviour of stocker cattle grazing alfalfa-grass pastures.** *Canadian Journal of Animal Science* 77(4): 677-682.

NAL Call Number: 41.8 C163.

Abstract: An experiment was conducted to determine the effects of grazing system (continuous and rotational), stocking rate (light, 1.1 steers ha⁻¹; heavy, 2.2 steers ha⁻¹) and season of use on forage intake and grazing behaviour of stocker cattle grazing an approximately 70% alfalfa (*Medicago sativa* L.), 25% meadow brome grass (*Bromus biebersteinii* Roem & Schult.) and 5% Russian wildrye (*Psathyrostachys juncea* (Fisch.) Nevski) pasture. To determine organic matter intake, grazed herbage was collected with esophageal fistulated cattle and analyzed for in vitro digestible organic matter while fecal output was determined using chromic oxide. These variables were used to calculate organic matter intake. Daily herbage consumption (g OM kg BW^{-0.75} d⁻¹ and kg OM d⁻¹) did not differ ($P > 0.05$) for either grazing system or stocking rate from 1991 to 1993, with the exception of greater ($P < 0.05$) intakes at light compared with heavy stocking rates (10.9 vs. 8.4; kg OM d⁻¹) late in the 1991 season. Grazing time was usually lower (8.9 vs. 10.3 h (3-yr mean); $P < 0.05$) in lightly than in heavily stocked pastures. As available herbage increased, cattle spent less time grazing ($y = 12.46, 0.00103 x; r = 0.48, RSD = 2.04, P < 0.001$; where y = grazing time and x = herbage mass). Biting rates ranged from 28 to 32 bites min⁻¹, regardless of year, season, grazing system or stocking rate. Rate of intake (g OM kg⁻¹ BW^{0.75} h⁻¹) did not differ ($P > 0.05$) for either grazing system, although it tended to be greater ($P < 0.10$) at light than at heavy stocking rates. As animals in lightly stocked pastures spent less time grazing, herbage was consumed at an increased rate, which was reflected in increased average daily gain ($y = 0.067 x; r = 0.86, RSD = 0.14, P < 0.001$; where y = daily gain and x = intake rate). Our results suggest that daily herbage consumption was not affected by grazing system or stocking rate; however, at lower stocking rates, grazing time declined and intake rate tended to increase.

Keywords: medicago sativa, bromus biebersteinii, psathyrostachys juncea, steers, stocking rate, seasons, feed intake, rotational grazing, continuous grazing, grazing, organic matter, in vitro digestibility, feces, biting rates, live weight gain, growth rate, grazing time, Manitoba.

Porte, F.E.; Manterola, B.H.; Cerda, A.D.; Mira, J.J. (1997). **Productive behavior and study of ruminal parameters in steers fed different levels of swine feces. [Comportamiento productivo y estudio de parametros ruminales, de novillos alimentados con niveles crecientes de inclusion de fecas de cerdo en su racion.]** *Avances en Produccion Animal* 22(1/2): 81-90, ISSN: 0378-4509.

NAL Call Number: SF1 A9.

Keywords: manures, feeding pig manure to growing beef cattle, rumen metabolism, pH, digestibility, feeding, feed conversion efficiency, live weight gain, nutritive value, carcass composition, Spanish language, Chile.

Potter, L.; Piva, L.J.F.; Mielitz, N.C.G.A (2000). **Economic analyses of a production model to primiparous beef heifers at two, three and four years of age.** *Revista Brasileira de Zootecnia* 29(3): 861-870.

NAL Call Number: SF1 R45.

Keywords: beef cattle, female, heifer, primiparous, economic analysis, nutritional systems, continuous grazing, cultivated annual ryegrass natural pasture, feedlot diets, sorghum silage plus urea, Portuguese language.

Pozdisek, J. (1998). **Voluntary intake of fresh forage of selected grass species conserved by freezing in cattle. [Dobrovolny příjem zelene píce vybraných druhů trav konzervované zamrazováním u skotu.]** *Zivocisna Vyroba - UZPI* 43(8): 349-354, ISSN: 0044-4847.

NAL Call Number: SF1.C94

Keywords: feed grasses, dactylis, festuca arundinacea, lolium perenne, freezing, feed intake, proximate composition, feeding behavior, feeding habits, feeds, festuca, gramineae, grasses, lolium, Language Czech.

Prawl, Z.I.; Hill, W. J.; Owens, F.N.; Gill, D.R.; Ball, R.L.; Porter, R. (1997). **Effects of limited access time to feed on feedlot performance and carcass characteristics.** *Journal of Animal Science* 75 (SUPPL. 1): 239, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: steers, carcass characteristics, feed efficiency, feed, to gain ratio, feedlot performance, limited access time to feed, effects, feeding, behavior.

Pugh, D.G. (1996). **Feeding broiler litter to beef cows.** *Bovine Practitioner* 30: 59-61, ISSN: 0524-1685.

NAL Call Number: SF779.5 A1B6.

Keywords: wastes, poultry manure, utilization, diseases, health risks to cattle, bacteria, feeds.

Rankins, D.L.; et al (2002). **The importance of by-products to the US beef industry.** *Veterinary Clinics of North America. Food Animal Practice* 18 (2): 207-11, ISSN: 0749-0720.

NAL Call Number: SF601 V535.

Abstract: The use of by-products as nutrient sources for beef cattle will continue to be driven by economics. As landfill prices continue to escalate, more by-products will become economically viable as cattle feed. These considerations will be counter-balanced by safety concerns. American consumers are becoming increasingly concerned with the production aspects of their food. The environmental concerns associated with additional landfills will have to be balanced against which by-products consumers will accept in the production of the beef that they consume. These will most assuredly heighten over the coming years.

Keywords: feed, food handling, economics, meat standards, feed standards, nutrition, consumer product safety, cost-benefit analysis, USA.

Rankins, D.L.; Poore, M.H.; Capucille, D.J.; Rogers, G.M.; et al. (2002). **Recycled poultry bedding as cattle feed.** *Veterinary Clinics of North America. Food Animal Practice* 18 (2): 253-66, ISSN: 0749-0720.

NAL Call Number: SF601 V535.

Abstract: Since the 1950s, recycled poultry bedding has been used as an economical feedstuff for beef cattle. It has been extensively studied at several experiment stations around the world with regard to its safety and nutritional aspects. It will continue to be closely scrutinized as the public increases its awareness of agricultural issues. As this study was being prepared, the news media was "spotlighting" bovine spongiform encephalopathy. Currently, in the United States there is a ban on incorporation of mammalian-derived protein feeds into ruminant diets. This has led to a requirement of beef cattle producers signing affidavits indicating that they had met this obligation. Some poultry companies use ruminant meat and bone meal in broiler diets when least-cost formulation indicates that it is economically desirable. This then poses the question of whether feeding RPB to beef cattle should be permitted if the birds had been fed ruminant meat and bone meal. It also raises the question of whether cattle grazing pastures fertilized with RPB are exposed to ruminant meat and bone meal. Because of the importance of pasture fertilization as a waste disposal solution for the poultry industry, it seems that the issue will be quickly resolved by omitting the ruminant meat and bone meal from poultry diets should concerns increase. Use of RPB, like many byproduct feeds, requires a higher level of management expertise than traditional feeds. Despite the potential problems discussed in this study, an informed beef cattle producer can gain a financially competitive edge by using RPB. A simple processing method, deep-stacking under polyethylene sheeting, can produce a safe product that will provide a complete diet when blended with an energy source and supplemented with some long-stem fiber. The diets can be used for both brood cows and stocker calves for extended periods of time, and the practice of feeding RPB is safe for both cattle and consumers. Economic parameters will influence the future use of RPB; however, the general public's perception and acceptance will ultimately determine its long-term use.

Keywords: cattle feed, poultry manure, dietary fiber, analysis, dietary proteins, safety, review.

Rathmacher, J.A.; Bonilla, F.J.; Nissen, S. (1996). **Effects of recombinant bovine growth hormone and androgen, estrogen growth promotants on growth and plasma metabolites of beef cattle.** *Journal of Animal Science* 74 (SUPPL. 1): 297: ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: anabolic agent, hormone, drug.

Rausch, M.I.; Tripp, M.W.; Govoni, K.E.; Zang, W.; Weber, W.J.; Crooker, B.A.; Hoagland, T.A.; Zinn, S.A. (2002). **The influence of level of feeding on growth and serum insulin-like growth factor I and insulin-like growth factor-binding proteins in growing beef cattle supplemented with somatotropin.** *Journal of Animal Science* 80 (1): 94-100, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: insulin like growth factor I, serum concentration, insulin like growth factor binding protein 2, insulin like growth factor binding protein 3, somatotropin, dietary supplement, body composition, feed efficiency, feeding level, growth, weight gain.

Realini, C.E.; Hodgson, J.; Morris, S.T.; Purchas, R.W. (1999). **Effect of sward surface height on herbage intake and performance of finishing beef cattle.** *New Zealand Journal of Agricultural Research* 42 (2): 155-164, ISSN: 0028-8233.

NAL Call Number: 23 N4892.

Keywords: Angus crosses, finishing steers, forage crops, *Lolium perenne* (perennial ryegrass), *Trifolium repens* (white clover), sward surface height, weight gain, compensatory growth, cattle performance, herbage intake, ingestive behavior, meat, quality characteristics.

Restle, J.; Roso, C.; Aita, V.; Nørnberg, J.L.; Brondani, I.L.; Cerdas, L.; Carrilho, C. de O. (2002). **Animal performance in summer grasses pastures. [Produção animal em pastagem com gramíneas de estação quente.]** *Revista Brasileira de Zootecnia* 31(3) Suppl.: 1491-1500, ISSN: 1516-359.

NAL Call Number: SF1 R45.

Keywords: beef cattle, pastures, grazing, sorghum, millets, weight gain, brachiaria, behavior, feeding habits, grazing lands, land resources, natural resources, nonrenewable resources, plant products, poaceae, Portuguese language, Brazil.

Rivera, J.D.; Duff, G.C.; Galyean, M.L.; Stalker, L.A.; Reed, M.M.; Mitchell, B.R. (2002). **Effects of vitamin E supplementation on feed intake and febrile responses of beef cattle challenged with infectious bovine respiratory virus.** *Journal of Dairy Science* 85 (Supplement 1): 48, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: crossbred, host, infectious bovine respiratory virus, pathogen, fever, vitamin E, dietary supplement, average daily gain, dry matter intake, feed intake, rectal temperature, New Mexico, USA.

Rogers, G.M.; Poore, M.H. Paschal, J.C.; et al (2002). **Feeding cotton products to cattle.** *Veterinary Clinics of North America. Food Animal Practice* 18 (2): 267-94, ISSN 0749-0720.

NAL Call Number: SF601 V535.

Keywords: feeding, cottonseed products, gossypol toxicosis, lower production costs, economics, dietary analysis.

Rogers, G.M.; Capucille, D.J. (2000). **Colostrum management: keeping beef calves alive and performing.** *Compendium on Continuing Education for the Practicing Veterinarian* 22 (1): S6-S13, ISSN: 0193-1903.

NAL Call Number: SF601 C66.

Keywords: beef calves, calf feeding, colostrum, passive transfer, colostral immunity parity, age, breed, nutritional state, feeding, lactation, udder conformation, health, vaccination status, parturition, dystocia, twinning, reviews.

Rude, B.J.; Hanson, K.C.; Tucker, W.B. (2002). **Effect of supplementing corn or hay to beef cattle consuming annual ryegrass (*Lolium multiflorum*) on performance and nutrient utilization.** *Journal of Applied Animal Research* 21 (1): 35-48, ISSN: 0971-2119. **NAL Call Number:** SF55 I4J68.

Keywords: breed, Angus, Hereford, female, heifer, nutrition, *Lolium multiflorum* (ryegrass), forage crop, acid detergent fiber, dry matter, neutral detergent fiber, organic matter, protein digestibility, bermudagrass hay, feed, dietary supplementation, body weight gain, cracked corn, growth performance, nutrient utilization.

Sampaio, A.A.M.; de Brito, R.M.; Carvalho, R.M. (2002). **Comparison of diet evaluation systems for cattle in an intensive beef production model. Feedlot of young bulls. [Comparacao de sistemas de avaliacao de dietas para bovinos no modelo de producao intensiva de carne. Confinamento de tourinhos jovens.]** *Revista Brasileira de Zootecnia* 31 (1):157-163, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: breed, Canchim x Nelore, economic analysis, Cornell Net Carbohydrate and Protein System, Intestine Digestible Protein System, Metabolizable Protein System, beef production, body weight gain, feed, corn grain, feed, corn silage, cottonseed meal, diet, feedlot, soybean meal, whole soybean, Portuguese language.

Santos Alvarez, B. (2000). **Use of probiotics in dairy cattle. [Uso de probi ticos en ganado vacuno de leche.]** *Nuestra Caba a* 297: 42-46, ISSN: 0210-5659.

Keywords: rumen digestion, animal nutrition, probiotics, digestibility, animal feeding, animal performance, Spanish language.

Sanz Parejo, E (1999). **Feeding of meat cow in extensive husbandry. [Alimentacion de la vaca de carne en extensivo.]** *Mundo Ganadero* 109: 32-36, ISSN: 0214-9192.

Keywords: hay, supplements, feed intake, behavior, feeding habits.

Schoeman, S.J. (1996). **Nutrient requirements of beef cattle, Seventh edition.**

Suid-Afrikaanse Tydskrif vir Veekunde 26 (1): 15-19, ISSN: 0375-1589.

NAL Call Number: SF1 S6.

Keywords: bulls, growth, body weight data, weaning records, National Beef Cattle Performance, progeny testing.

Scholz, H.; Moerchen, F.; Schaefer, S.; Fahr, R. (2002). **Supplementation of grain to suckling beef calves during the grazing period. [Zufuetterung von Getreide an maennliche Kaelber aus der Mutterkuh-haltung waehrend der Weideperiode.]** *Archiv fuer Tierzucht* 45 (6): 511-521, ISSN: 0003-9438.

NAL Call Number: 49 AR23.

Abstract: A study on 65 beef cow-calf pairs was conducted to investigate the intake of a feed supplementation with grain and its interrelations to performance and behavioural characteristics of suckling calves, as well as the development of body condition and milk yield of the dam. The intake of grain in the group receiving the supplementation (group B)

was on average 2.7 kg/calf/day during the grazing period. A substantial individual variation of feed intake from 1.8 kg to 7.7 kg grain/calf/day was determined. In this period, the daily gains and the weaning weights of the calves in group B were higher (15.4% resp. 7.4%). The advantage of the calves of the group B could be proven only in the second half of the grazing period. The supplementation of grain caused significantly lower suckling activities and grazing periods per day. Effects of a grain supplementation in the feeding of suckling calves on pasture could not be determined on both the body condition and the milk yield of the cows.

Keywords: body condition, feed intake, grain, animal feed, milk yield, pasture grazing, suckling, weaning weight.

Schwartzkopf-Genswein, K.S.; Atwood, S.; McAllister, T.A. (2002). **Relationships between bunk attendance, intake and performance of steers and heifers on varying feeding regimes.** *Applied Animal Behaviour Science* 76 (3):179-188, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: beef cattle, steers, heifers, feeding behavior, duration, restricted feeding, unrestricted feeding, feed intake, dry matter, liveweight gain, feed conversion, eating rates, feeding frequency, individual characteristics, data collection, transponders, radio waves, fattening performance.

Schwarz, F.J.; Kirchgessner, M.; Stangl, G.I. (2000). **Cobalt requirement of beef cattle, feed intake and growth at different levels of cobalt supply.** *Journal of Animal Physiology and Animal Nutrition* 83(3): 121-131, ISSN: 0931-2439.

NAL Call Number: 389.78 Z3.

Keywords: beef bulls, German Simmental, performance criteria, growth, feed intake, energy intake, nutrient intake, carcass criteria, corn silage, nutrient intake, quadratic model.

Seixas, J.R.C.; Ezequiel, J.M.B.; Araujo, W. de A.; Resende, F.D. de; Martins Junior, A.; Kronka, S. do N.; Silva, L. das D.F. da; Dourado, J.B.; Soares, W.V.B. (1999). **Performance of beef cattle in feedlot feeding with diets based on cottonseed meal, urea or starea.** [Desempenho de bovinos confinados alimentados com dietas a base de farelo de algodao, ureia ou amireia.] *Revista Brasileira de Zootecnia* 28(2): 432-438, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: feedlots, cottonseed meal, diet, urea, animal performance, oil mill byproducts, oilseed cakes, Portuguese language, Brazil.

Sekine, J.; Jin, H.; Oura, R.; Hishinuma, M. (1998). **Effect of kinds of forage on feed intake and time spent for eating and rumination of Japanese black cows.** *Animal Science and Technology* 69(9): 865-869, ISSN: 0918-2365.

NAL Call Number: 49 N62.

Keywords: feed intake, hay, rice straw, crop residues, digestion, eating disorders, rumination, behavior, agricultural wastes, Japan.

Shimojo, M.; Bungo, T.; Imura, Y.; Tobisa, M.; Koga, N.; Nakano, Y.; Goto, I.; Masuda, Y. (1997). **Relative growth rate of beef cattle expressed using factors related to feed intake, maintenance requirements and feed efficiency.** *Journal of the Faculty of Agriculture Kyushu University* 42 (1, 2): 87-93, ISSN: 0023- 6152.

NAL Call Number: 107.6 K995.

Keywords: growth analysis, feed intake, maintenance requirements, feed efficiency, mathematical equations, daily intake, body weight, metabolic body size, metabolizable energy, relative growth rate.

Sindt, J.J.; Drouillard, J.S.; Thippareddi, H.; Phebus, R.K.; Lambert, D.L.; Montgomery, S.P.; Farran, T.B.; LaBrune, H.J.; Higgins, J.J., Ethington, R.T. (2002). **Evaluation of finishing performance, carcass characteristics, acid-resistant *E. coli* and total coliforms from steers fed combinations of wet corn gluten feed and steam-flaked corn.** *Journal of Animal Science* 80 (12): 3328-3335, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: *Escherichia coli* (Enterobacteriaceae), beef cattle crossbred steers, , feces, rumen, total coliform count, finishing performance, carcass characteristics, dietary manipulations, finishing diets, pH, steam-flaked corn.

Skunmun, P.; Chantalakhana, C.; Pungchai, R.; Poondusit, T.; Prucasri, P. (2002). **Comparative feeding of male dairy, beef cattle and swamp buffalo I. Economics of beef production.** *Asian-Australasian Journal of Animal Sciences* 15 (6): 878-883, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: beef cattle, dairy cattle, swamp buffalo, beef production, meat product, meat quality, body weight, concentrate, feeding performance, growth, Thailand, Asia.

Skunmun, P.; Chantalakhana, C.; Pungchai, R.; Poondusit, T.; Prucasri, P. (2002). **Comparative feeding of male dairy, beef cattle and swamp buffalo I. Economics of beef production.** *Asian-Australasian Journal of Animal Sciences* 15 (6): 878-883, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: beef cattle, dairy cattle, swamp buffalo, beef production, meat product, meat quality, body weight, concentrate, feeding performance, growth, Thailand, Asia.

Song , M.K.; Choi, S.H. (2001). **Growth promoters and their effects on beef production.** *Asian, Australasian Journal of Animal Sciences* 14(1): 123-135, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: growth promoters, anabolic implants, zeranol, trenbolone acetate, estradiol, progesterone, propionate, testosterone, drug, growth stimulant, implant, pollutant, dietary supplement, implantation, lasalocid, lysocellin, monensin, average daily gain, carcass characteristics, diet, feed conversion, feed efficiency, growth, literature review.

Soto, R.; Rubio, I.; Galina, C.S.; Castillo, E.; Rojas, S. (2001). **Effect of pre- and post-partum feed supplementation on the productive and reproductive performance of grazing primiparous Brahman cows.** *Tropical Animal Health and Production* 33 (3): 253-264, ISSN: 0049-4747.

NAL Call Number: SF601 T7.

Keywords: Brahman cows, breed, feed supplementation, pre- and post-calving, reproductive performance, digestible energy, dry matter, crude protein, body weight, body condition score, urea, plasma, estrus, pregnancy rates.

Sowell, B.F.; Bowman, J.G.P.; Grings, E.E.; Macneil, M.D. (2003). **Liquid supplement and forage intake by range beef cows.** *Journal of Animal Science* 81 (1) 294-303, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cows, feeding, food supplement, liquid product, fodder, voluntary intake, feeding behavior, food intake, experimental study, crude protein, urea, rangeland.

Sowell, B.F.; Wallace, J.D.; Branine, M.E.; Hubbert, M.E.; Fredrickson, E.L.; Bowman, J.G.P. (1996). **Effects of restricted suckling on forage intake of range calves.** *Journal of Range Management* 49(4): 290-293.

NAL Call Number: 60.18 J82.

Abstract: Twenty two-year-old primiparous Angus X Hereford cows and their heifer calves were used to study effects of milk consumption on calf performance, suckling behavior, and forage intake. Ten cow-calf pairs were allotted to each of 2 treatments on blue grama (*Bouteloua gracilis* [H.B.K.] Lag.) rangeland. Calves from 5 cows were prevented from suckling the rear udder quarters for 4 weeks to reduce milk intake by 32% when calves averaged 71 +/- 4 days of age. The other 5 calves were allowed to suckle normally. Four 12-day sampling periods were conducted from June through September. Calves from the control treatment weighed more ($P < 0.05$) than restricted calves in each period and at weaning. Calves from the restricted treatment did not ($P > 0.10$) suckle longer or more frequently than control calves during any sampling period. Forage organic matter intake was not ($P > 0.10$) different between cows or calves from either group at any date. Milk production was not different ($P > 0.10$) between groups 1 month after restriction periods were terminated. Calves on 4 week milk restriction did not increase forage organic matter intake and had decreased weaning weights compared to control animals.

Keywords: calves, suckling, beef cattle, *bouteloua gracilis*, restricted feeding, feeding behavior, physical activity, voluntary intake, forage, digestibility, biomass, digesta, fiber content, nitrogen content, body weight, feed intake, New Mexico.

Spears, J.W. (1996). **Beef nutrition in the 21st century.** *Animal Feed Science Technology* 58(1-2): 29-35, ISSN: 0377-8401.

NAL Call Number: SF95 A55.

Keywords: animal nutrition, supplements, consumer behavior, beef quality, animal products, USA.

Sprinkle, J.E.; Holloway, J.W.; Warrington, B.G.; Ellis, W. C.; Stuth, J.W.; Forbes, T.D.A.; Greene, L.W. (2000). **Digesta kinetics, energy intake, grazing behavior, and body temperature of grazing beef cattle differing in adaptation to heat.** *Journal of Animal Science* 78(6): 1608-1624, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: subtropics, Brahman, American Angus, Tuli, cows, cattle breeds, crossbreeding, crosses, breed differences, body condition, body temperature, cattle feeding, digesta, digestive tract, energy intake, environmental factors, environmental temperature, grazing, feeding behaviour, feed intake, heat adaptation, lactation, night grazing, Texas.

Steen, R.W.J.; Kilpatrick, D.J.; Porter, M.G. (2002). **Effects of the proportions of high or medium digestibility grass silage and concentrates in the diet of beef cattle on liveweight**

gain, carcass composition and fatty acid composition of muscle. *Grass and Forage Science* 57 (3): 279-291, ISSN: 0142-5242.

NAL Call Number: 60.19 B773.

Keywords: beef, male, steer, muscle, fatty acid composition, muscular system, omega-3 polyunsaturated fatty acids, barley meal based concentrate, animal feed, carcass composition, concentrate supplementation, grass silage, high digestibility, medium digestibility, liveweight gain, soyabean meal based concentrate.

Thorp, C.L.; Wylie, A.R.G.; Steen, R.W.J.; Shaw, C.; McEvoy, J.D. (2000). **Effects of incremental changes in forage: Concentrate ratio on plasma hormone and metabolite concentrations and products of rumen fermentation in fattening beef steers.** *Animal Science: An International Journal of Fundamental and Applied Research* 71(1): 93-109, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Keywords: Simmental x Friesian, breed, steer, open, circuit respiration calorimetry, dry matter, metabolizable energy, perennial ryegrass silage, rolled barley, rumen fermentation.

Tilden, W.; Cecava, M.J. (1995). **Beef Cattle Feeding and Nutrition** Academic Press: San Diego, CA, 2nd ed., 389 p.

NAL Call Number: SF203 P46 1995.

Keywords: feeding, nutrition, breeding to finishing, vitamins, minerals, protein, computer modeling, ration formulation, feed stuffs, pasture and forages, hay, silage, concentrates.

Tima, M.P.; Figueroa, M.R.; Borquez, F.L.; Fuentes, T.F. (1996). **Fattening of growing bulls and heifers in an intensive beef cattle production system. [Engorda de toritos y vaquillas aberdeen angus en un sistema intensivo de produccion de carne bovina.]** *Agro-Ciencia* 12(1): 75-81, ISSN: 0716-1689.

NAL Call Number: S15 A377.

Keywords: intensive husbandry, bulls, heifers, age, fattening, winter, maize, silage making, oats, feed processing, feeding, weight gain, meat yield, copulation, Spanish language, Chile.

Trela, J.; Choroszy, Z.; Czaja, H.; Choroszy, B. (2002). **Effectiveness of producing young beef cattle on permanent pastures. [Efektywnosc produkcji mlodego zywca wolowego z wykorzystaniem uzytkow zielonych.]** *Biuletyn Informacyjny Instytut Zootechniki* 40 (3):109-116, ISSN: 0209-2492.

NAL Call Number: SF1 K7.

Keywords: beef, breed, Black-and-White x Limousin, crossbred, fattening traits, permanent pastures, production effectiveness, slaughter traits, Polish language.

Tripp, M.W.; Ju, J.C.; Hoagland, T.A.; Riesen, J.W.; Yang, X.; Zinn, S.A. (2000). **Influence of somatotropin and nutrition on bovine oocyte retrieval and in vitro development.** *Theriogenology* 53(8): 1581-1590, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5.

Keywords: yearling beef heifers, effects of, bovine somatotropin (bST), limit feeding, follicular growth, oocyte competence, in vitro fertilization, in vitro maturation, feeding, nutrition.

Tripp, M.W.; Hoagland, T.A.; Dahl, G.E.; Kimrey, A.S.; Zinn, S.A. (1998). **Methionine and somatotropin supplementation in growing beef cattle.** *Journal of Animal Science* 76 (4): 1197-1203, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: growing beef cattle, steers, heifers, dietary supplements, bovine somatotropin, methionine, average daily gain, feed efficiency, body composition, serum concentrations serum, IGF, 1 (insulin, like growth factor, 1), progesterone.

Twardy, J.(1996). **Production effects of extensive grazing of heifers in Carpathians.**

[**Efekty produkcyjne przy ekstensywnym wypasie jałowizny w Karpatach.**] *Zeszyty Naukowe Akademii Rolniczej we Wrocławiu. Konferencje* 291: 217-223, ISSN: 1232-3071.

Keywords: heifers, pastures, feed grasses, feeding systems, grazing, paddock grazing, rotational grazing, mountain farming, weight gain, Polish language, Poland.

Vaz, F.N.; Restle, J.; Brondani, I.L.; Da Costa, E.C.; Vaz, R.Z.; Roso, C.; Carrilho, C.O. (2002). **Energetic supplementation on carcass and meat quality of cull cows of different ages, finished on cultivated winter pasture under temporary grazing.** [Suplementacao energetica sobre a qualidade da carcaca e da carne de vacas de diferentes idades, terminadas em pastagem cultivada de estacao fria sob pastejo horario.] *Revista Brasileira de Zootecnia* 31(1): 173-182, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: ryegrass, forage crop, beef cattle, breed, Charolais, cow, carcass quality, meat quality, meat tenderness, pasture grazing, Portuguese language.

Ward, J.D.; Spears, J.W. (1999). **The effects of low-copper diets with or without supplemental molybdenum on specific immune responses of stressed cattle.** *Journal of Animal Science* 77(1): 230-237. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Angus bull calves (n = 42; 7 mo of age; 254 kg initial BW) were used to investigate the effects of dietary Cu and Mo on immune function of stressed cattle. Randomly selected calves (n = 22) were injected with 90 mg of Cu as Cu glycinate 28 d before weaning and castrated at weaning. These calves received 7.5 and 5 mg of supplemental Cu/kg of DM during a 41-d receiving phase and a 196-d growing phase, respectively. The remainder of the steers received no supplemental Cu during the experiment. Copper-supplemented steers had adequate Cu status at weaning, whereas unsupplemented calves were marginally Cu-deficient. Cell-mediated response to intradermal injection of phytohemagglutinin was not affected by dietary treatment during the receiving phase. During the growing phase, half of the steers in each Cu treatment were given 5 mg of supplemental Mo/kg of DM. Copper supplementation increased (P < .05) humoral response to ovalbumin injected on d 133 of the growing phase. On d 168 of the growing phase, calves receiving only supplemental Mo were severely Cu-deficient based on plasma and liver Cu concentrations. The other treatment groups had adequate Cu status. Before feeding on d 168 of the growing phase, half of the steers were loaded onto trailers and transported 2.5 h, and they remained on the trailers an additional 9.5 h. Humoral response to porcine erythrocytes (PRBC) and delayed-type hypersensitivity (DTH) to dinitrochlorobenzene was tested at the end of the stress period. There was a Cu x stress interaction for humoral response to PRBC, with Cu decreasing antibody titers in unstressed calves and increasing titers in stressed steers. Stressed steers had lower (P = .03) ADG during the 28 d following stress. The results of this study indicate that

Cu deficiency and 5 mg of supplemental Mo/kg of DM do not dramatically alter the specific immunity of stressed cattle.

Keywords: steers, stress, copper, molybdenum, dietary minerals, healing, castration, antibody formation, skin tests, blood plasma, ceruloplasmin, enzyme activity, hydrocortisone, mineral deficiencies.

Wertz E; Berger LL; Walker, P.M.; Faulkner, D.B.; McKeith, F.K.; Rodriguez-Zas, S. (2001). **Early weaning and postweaning nutritional management affect feedlot performance of Angus X Simmental heifers and the relationship of 12th rib fat and marbling score to feed efficiency.** *Journal of Animal Science* 79(7):1660-1669, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breed, Angus X Simmental, heifer, effects of postweaning nutritional management, feedlot performance, carcass traits, intramuscular and subcutaneous fat deposition, feed efficiency, grazing, endophyte-infected tall fescue, concentrate diet, average daily gain, feed efficiency, feedlot performance, growth.

Wheeler, J.S.; Lalman, D.L.; Horn, G.W.; Redmon, L.A.; Lents, C.A. (2002). **Effects of supplementation on intake, digestion, and performance of beef cattle consuming fertilized, stockpiled bermudagrass forage.** *Journal of Animal Science* 80 (3): 780-9, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef, cows, supplement protein concentration, forage intake, forage utilization, stockpiled bermudagrass.

White, T.W.; Saxton, A.M. (1998). **Forage feeding behavior of hereford and hereford crossbred steers during the summer.** *The Professional Animal Scientists* 14(1): 62-67. Online version: <http://www.arpas.uiuc.edu/pas/pas.html>.

NAL Call Number: SF51 P76.

Keywords: breeds, Hereford, Brahman, Aberdeen-Angus, crossbreds, steers, forage, summer, air temperature, pastures, breed differences, shade, pens, grasses, animal behavior, diurnal variation.

Williams, J.J.; Greene, L.W. (2002). **Effects of dietary cation anion balance on blood parameters and performance characteristics of beef cattle during the pre-receiving and receiving phases of the feedlot.** *Journal of Dairy Science* 85 (Supplement 1): 273, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: beef heifer, blood and lymphatics, pH, urine, bicarbonate ion, calcium(II) ion, dietary intake, magnesium(II) ion--dietary intake, potassium ion dietary intake, sodium ion dietary intake, average daily gain (ADG), dietary cation anion balance, feed intake, feedlot performance, partial carbon dioxide pressure.

Woods, V.B.; O'Mara, F.P.; Moloney, A.P. (2002). **The in situ ruminal degradability of concentrate feedstuffs in steers as affected by level of feed consumption and ratio of grass silage to concentrate.** *Animal Feed Science and Technology* 100 (1-2): 15-30, ISSN: 0377-8401.

NAL Call Number: SF95 A55.

Keywords: steers, Friesian, breed, feeding level, dry matter, grass silage, concentrate, in situ ruminal degradability, digestibility, feed consumption, diet.

Wright, I.A.; Maxwell, T.J.; Russel, A.J.F.; Hunter, E.A.; Sibbald, A.R.; Hetherington, R.A., Whyte, T.K. (1996). **The effect of grazed sward height and stocking rate on animal performance and output from beef cow systems.** *Grass and Forage Science* 51(2): 199-208.

NAL Call Number: 60.19 B773.

Keywords: cows, stocking density, height, body condition, silage, lolium perenne, meat production.

Xiccato, G., Trocino, A., Queaque, P. I., Sartori, A., Carazzolo, A. (2002). **Rearing veal calves with respect to animal welfare: effects of housing and solid feed supplementation on growth performance and meat quality.** *Livestock Production Science* 75(3): 269-280. ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Abstract: This study aims to evaluate how rearing techniques that improve veal calf welfare affect growth performance and carcass and meat quality, by comparing both traditional rearing in individual stalls with group rearing in collective pens and exclusive milk feeding with maize grain supplementation. Eighty male calves were raised from 60 days-of-age (live weight 76.4 plus or minus 5.5 kg) until slaughter (at 182 and 189 days-of-age). Both group rearing and maize grain supplementation significantly improved growth performance (final live weight: +7 kg in group-reared calves compared to individually reared calves, and +10 kg in maize-supplemented calves compared to exclusively milk-fed calves) and carcass conformation, with no differences in dressing percentage. Group rearing increased blood packed cell volume value. Neither the type of housing nor the feeding system significantly modified carcass or meat colour or the main physical and sensory traits of the meat. Carcass fatness and meat ether extract concentration were higher in the calves reared in individual stalls or supplemented with maize grain. Our results suggest that rearing veal calves in pens and providing solid feed supplements may improve growth performance without impairing carcass and meat quality.

Keywords: husbandry, animal welfare, beef cattle, carcass quality, housing, growth, haematocrit, maize, meat composition, meat quality, veal, veal calves. Copyright© 2003, CAB International

Zaman, M.S.; Mir, Z.; Mir, P.S.; El-Meadawy, A.; McAllister, T.A.; Cheng, K.J.; ZoBell, D.; Mathison, G.W. (2002). **Performance and carcass characteristics of beef cattle fed diets containing silage from intercropped barley and annual ryegrass.** *Animal Feed Science and Technology* 99 (1-4): 1-11, ISSN: 0377-8401.

NAL Call Number: SF95 A55.

Keywords: barley, ryegrass, animal performance, carcass characteristics, diet evaluation, feeding studies, dry matter yield, feed conversion efficiency.

Zanetti, M.A.; Resende, J.M.L.; Schalch, F.; Miotto, C.M. (2000). **Performance of steers fed different protein supplements in the mineral mixtures.** *Revista Brasileira de Zootecnia* 29(3): 935-939.

NAL Call Number: SF1 R45.

Keywords: crossbreed beef cattle evaluation, commercial mineral supplements, salt, protein, urea, mineralized salt, *Braquiaria decubens* grass, sugar cane supplementation, weight gain, Portuguese language.

General

Atkinson, D.; Watson, C.A. (1996). **The environmental impact of intensive systems of animal production in the lowlands.** *Animal Science: An International Journal of Fundamental and Applied Research* 63 (3): 353-361, ISSN: 0003-3561.

NAL Call Number: SF1 A56.

Keywords: dairy cattle, beef cattle, animal wastes, waste disposal, pollution, poultry, husbandry, wildlife, species diversity, nitrogen, silvopastoral systems, grasslands, management, environmental degradation, reviews, farming systems, intensive livestock farming, sustainability, agroforestry, cycling, agroforestry systems, lowland areas, environment, United Kingdom.

Australia, Standing Committee on Agriculture and Resource Management (1997). **National Guidelines for Beef Cattle Feedlots in Australia.** (2nd edition), CSIRO Publishing: Collingwood, Australia, 47 p., ISBN: 0-643-06008-1.

NAL Call Number: SF203 N38 1997.

Keywords: feedlots, feedlot effluent, waste, drainage, animal welfare, guidelines, ,Australia.

Baker, R.M.; Fisher, M.; Hemsworth, P.H. (2001). **Farm Animals in Research: Can We Meet the Demands of Ethics, Welfare, Science and Industry? Proceedings of the Conference Held at the Waite and Roseworthy Campuses of the University of Adelaide, November 30, December 1, 2000,** ANZCCART: Adelaide, SA.

NAL Call Number: HV4757 F39 2001.

Keywords: animal welfare, laboratory animals, cloning, transgenics, human-animal interactions, farm animal disease models, Australia, New Zealand.

Barcos, L.O. (2001). **Recent developments in animal identification and the traceability of animal products in international trade.** *Revue Scientifique et Technique* 20(2): 640-51, ISSN: 0253-1933.

NAL Call Number: SF781 R4.

Abstract: The author explores the variations in the domestic livestock populations world-wide between 1961 and 1998, and observes a marked increase in the swine population, as compared to other domestic species. Trends in international trade of live animals over the same period are also analysed; international trade involved 1% of livestock world-wide and the international meat market constituted 10% of total meat production. The various stages of the food chain are analysed, from farm to fork, with emphasis on those elements to which the concept of traceability is applicable; from the composition of bovines, to slaughter, and through the various products and sub-products all the way to the final product consumed. Against this background, the characteristics of identification systems for individual animals and animal products is described, as well as applications to traceback and trace forward. To conclude, the author details the factors which influence the various processes of identification and traceability, and thus must be considered when choosing a system. The wide variability amongst systems world-wide is noted and attributed to the differences in sanitary and economic or socio-cultural criteria. The author therefore recommends that work should begin on international harmonisation of such systems.

Keywords: animal identification systems, commerce, standards, international cooperation, trends, meat, standards, meat products, animal welfare, public health, quality control, safety, veterinary medicine.

Bartussek, H. (2000). **How to measure animal welfare? The idea of an “Animal Needs Index” ANI-35L (Tiergerechtheitsindex TGI 35L): a practical tool for assessing farm animal housing conditions on farm level in respect to animals’ well being and behavioural needs - Austrian experiences.** In: *Diversity of Livestock Systems and Definition of Animal Welfare. Proceedings of the Second NAHWOA Workshop, Cordoba, Spain, 8-11 January 2000*, Hovi, M.; Garcia Trujillo, R. (Eds.), University of Reading Library (RUL): Reading, UK, pp.135-142, ISBN: 0-7049-1092-6. Available online at: <http://www.veeru.reading.ac.uk/organic/proceedings.htm>

Keywords: housing, animal welfare, livestock, behavior, organic farming, Austria.

Colson, F. (1996). **Cattle farm of European countries. [Les exploitations allaitantes dans les pays membres de l’ Union europeenne: analyse selon le niveau d’ intensification de leur superficie fouragere.]** In: *Proceedings of the 3. meeting “Rencontres autour des recherches sur les ruminants.” Paris (France), December 4 and 5 1996. [3. Rencontres autour des recherches sur les ruminants. Paris (France), les 4 et 5 decembre 1996.]* Institut de l’ Elevage: Paris, France, p. 267-267, ISBN: 2-84148-022-4.

Keywords: beef cattle, farms, intensive husbandry, extensive husbandry, farm structure, farm income, international agreements, international relations, European Union, France, French language.

Cote, S. (In Progress). **Stockmanship: Powerful Tool for Grazing Management** United States Department of Agriculture, Natural Resources Conservation Service, Idaho.

Keywords: beef cattle, handling, behavior, grazing management tool, moving cattle, low stress, reduced disease incidence, increased productivity.

Dobicki, A. (2002). **Aspects of globalisation in cattle breeding.[Aspekty globalizacji w hodowli bydla.]** *Biuletyn Informacyjny Instytut Zootechniki* 40 (3): 33-46, ISSN: 0209-2492. **NAL Call Number:** SF1 K7.

Keywords: beef cattle, dairy cattle, breeding, industry, politics, global diversification, environmental conservation, corporate farming, family farms, European Union, Poland.

EMBRAPA Gado de Corte (2002). **Embrapa Beef Cattle Technologies: 25 Years of Research and Development** EMBRAPA Gado de Corte: Campo Grande, Brazil, 70p.

Keywords: husbandry, animal production, biotechnology, knowledge transfer, technology, pasture management, genetics, management, reproduction, health, economics, languages, English, Spanish, Portuguese, Brazil.

Ensminger, M.E.; Perry R.C. (1997). **Beef Cattle Science** Interstate Publishers: Danville, Il., 7th ed., 1104 p.

NAL Call Number: SF207 E5 1997.

Keywords: history and business of cattle raising, nutrient requirements, health, behavior, genetics, slaughter, feeding, breed registries, US and Canadian colleges of agriculture.

Ewbank, R.; Kim-Madslien, F.; Hart, C. B. (1999). **Management and Welfare of Farm Animals: UFAW Farm Handbook** Universities Federation for Animal Welfare: UK, 4th edition, 308 p., ISBN: 1-900630-00-1.

NAL Call Number: SF61 M35 1999.

Keywords: cattle, sheep, goats, pigs, poultry, rabbits, red deer, fishes, guineafowls, animal production, animal welfare, economics, nutrition, animal breeding , care.

Fabry, L. (1996). **Meat production: does extensification permit a good profitability in Belgium. [En production de viande, une certaine "extensification" permet-elle l'obtention d'une rentabilite comparable?]** *Elevages Belges* 50(10): 26-28, ISSN: 0770-2213.

Keywords: beef, meat production, profitability, extensification, feed crops, Belgium, French language.

Federation of Animal Science Societies (1999). **Beef Cattle Husbandry.** In: *Guide for the Care and Use of Agricultural Animals in Agricultural Research and Teaching*, First Revised Edition, Federation of Animal Science Societies (FASS): Savoy, Il., p 29-36.

NAL Call Number: QL55.G8 1999.

Keywords: facilities, environment, range, pasture management, feedlot, housing, feed, water, social environment, husbandry, dystocia, castration, dehorning, handling, transportation, euthanasia.

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NAL Call Number: S494.5.I5C3

Abstract: Animal production all over the world has been practised in three different systems: conventional, free range, and agroecological. In Brazil, conventional production systems for beef cattle, dairy cattle, sheep, goats, swine, and poultry are directed towards high productivity, placing the country among the main exporters. However, conventional systems have continuously excluded producers from the activity. Therefore, free range and agroecological systems are becoming more popular among those concerned with the welfare of animals and the environment. All three types of production are concerned with the quality of their products and are becoming certified. It is suggested that the traceability of the products should be ensured. It is also suggested that growing awareness on agroecological production will push agroecological products into the mainstream market in Brazil and in the world.

Keywords: alternative farming, animal production, certification, eggs, farming systems, free range husbandry, livestock, meat, milk, organic farming, organic foods, production, quality controls, sources, Portuguese language, Brazil.

Frelich, J.; Marsalek, M.; Riha, J. (1997). **Analysis of beef herds performance in individual production regions.** *Sbornik Jihoceska Univerzita Zemedelska Fakulta Ceske Budejovice Zootechnicka Rada* 14 (2): 3-16, ISSN: 1210- 6240.

NAL Call Number: SB13 S26.

Keywords: cow, calves, Angus, Bohemia Spotted, Charolais, breed, breed differences, calving interval, calf growth, calving age, early maturing, fertility, production regions, beet, growing , comparison, forage crop, growing, grain, growing, potato, growing, Czech language.

Gottardo, F.; Fregolent, G.; Preciso, S.; Cozzi, G.; Ragno, E.; Bianchi, C.; Mazzini, C.; Andrighetto, I. (2002). **Welfare of beef cattle. [Il benessere dei bovini allevati per la produzione di carne.]** *Informatore Agrario* 58 (6): 35-39, ISSN: 0020-0689.

NAL Call Number: 281.8 IN32.

Keywords: animal welfare, beef cattle, standards, EC Scientific Committee on Animal Health and Animal Welfare, stress, housing, feed access, aggressive behavior, diet, health, loading, unloading, Italian language, Italy.

Grandin, T. (2000). *Livestock Handling and Transport*, 2nd ed., CAB International: Wallingford, UK; New York, 449 p., ISBN: 0-85199-409-01.

NAL Call Number: SF88 L58 2000.

Keywords: cattle, swine, sheep, handling, fear, human animal relationships, stock person training, manager training, stress, welfare, assessment, transport, thermoregulation, meat quality, loading, unloading, slaughter.

Heatley, D. (2000). **Contribution of the live cattle export trade to the northern beef industry.** *Asian, Australasian Journal of Animal Sciences* 13 (Supplement Vol. C): 367-369, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: Australian beef industry, animal welfare, economics, food safety, live cattle trade.

Heleski, C.R.; Zanella, A.J.; Pajor, E.A. (2003) **Animal welfare judging teams a way to interface welfare science with traditional animal science curricula?** *Applied Animal Behaviour Science* 81(3): 279-289.

NAL Call Number: QL750.

Keywords: animal evaluation courses, animal science curricula, education, novel idea, conformation traits, animal welfare, welfare assessment, competitions, judging teams.

Hemsworth, P.H.; Coleman, G.J. (1998). *Human-livestock Interactions: the Stockperson and the Productivity and Welfare of Intensively Farmed Animals* CAB International: New York, NY, 152p.

NAL Call Number: HV4757 H46 1998.

Keywords: animal welfare, moral and ethical aspects, stockperson, skills, knowledge, status, attitudes, stockperson behavior, animal behavior, future opportunities.

Hovi, M.; Garcia Trujillo, R. (2000). *Diversity of Livestock Systems and Definition of Animal Welfare. Proceedings of the Second NAHWOA Workshop, Cordoba, Spain, 8-11 January 2000*, University of Reading Library (RUL): Reading, UK, 165p., ISBN: 0-7049-1092-6. Available online at: <http://www.veeru.reading.ac.uk/organic/proceedings.htm>

Keywords: farming, research methodologies, diversity, organic livestock systems, Austria, Spain.

Jarrige, R.; Beranger, C. (1992). *Beef Cattle Production* Elsevier: Amsterdam; New York, 487p., ISBN: 0444889841.

NAL Call Number: SF207 B454 1992.

Keywords: world beef production, reproduction, genetic improvement, growth, carcass traits, hormonal control of growth, carcass quality, nutrition, feeding, suckler cow, calves, growing and finishing cattle, pasture feeding, feedlot fattening, veal production, diseases, beef production in the tropics and semi-arid zones.

Jasiorowski, H.; Przysucha, T. (2002). **Current problems of development of beef cattle breeding in Poland.** [Aktualne problemy rozwoju hodowli bydła mięsnego w kraju.] *Biuletyn Informacyjny Instytut Zootechniki* 40 (3): 9-16, ISSN: 0209-2492.

NAL Call Number: SF1 K7.

Keywords: breeding, current problems, high-quality meat production, carcass classification, pedigree animal sales, profitability, Polish language, Poland.

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http://www.vetmed.ucdavis.edu/vetext/INF-BE_CarePrax.html

NAL Call Number: SF195 U6B43 1992.

Keywords: beef cattle industry, types of operations, breeds, nutrition, reproduction, behavior, stress, pain, identification, dehorning, weaning, facilities, transportation

Kadzere, C.T. (May 1997). **Emergent feedlotters in South Africa: Potential - Problems - Possibilities.** *Farmer's Weekly* 24-27.

NAL Call Number: 24 F225.

Keywords: beef cattle feedlots, common lands, rural communities, South Africa.

Kaus, R.; Lapworth, J.; Carroll, P. (1997). **The Stockman's Handbook** Department of Primary Industries: Queensland, Australia, 6th edition, 189p., ISBN: 0-7242-6701-8.

NAL Call Number: SF196 A8 S76 1997.

Keywords: beef cattle, animal husbandry, cattle diseases, regulatory control, marketing.

Kumm, K.I. (2002). **Sustainability of organic meat production under Swedish conditions.** *Agriculture, Ecosystems and Environment* 88 (1): 95-101, ISSN: 0167-8809.

NAL Call Number: S601.A34.

Abstract: World meat consumption has increased considerably during recent decades at the same time as questions about the sustainability of livestock systems. The aim of the paper is to investigate whether organic meat production can be more sustainable than conventional meat production. Organic meat production is supposed to use ecological resources, such as natural grasslands and by-products with low alternative value together with fodder that is grown without artificial fertilisers and pesticides. The organic animals are given the possibility of more natural behaviour, for example, they stay outdoors all year in nature and use simple buildings. For organic meat production to expand in a sustainable way, consumers must perceive it as at least as good as conventional production regarding environmental quality and price. Therefore, possible future organic and conventional meat production are compared regarding production costs, land requirements, soil conservation, nature conservation, energy needs, and chemical requirements as well as the discharge of nitrogen and greenhouse gases. The results suggest that organic production can be more sustainable than conventional production for beef and lamb, but not for pork. Organic beef and lamb production has advantages compared with conventional pig production regarding soil conservation, nature conservation and independence of chemicals. However, the production costs and discharge of nitrogen and greenhouse gases per kilo of meat are larger than in conventional pork production. Organic production also needs more land, which limits its sustainability if land for food production and energy crops is scarce. When food is scarce, organic meat production should aim to use land and by-products that cannot be used in any other way for food production.

Keywords: organic farming, sustainability, grasslands, fodder, animal behavior, animal housing, environmental protection, food prices, costs, soil conservation, nature conservation, energy requirements, agricultural chemicals, nitrogen, beef cattle, lambs, pigs, Sweden.

Macey, A. (2000). *Organic Livestock Handbook: a Project of Canadian Organic Growers Inc.* Canadian Organic Growers Inc.: Ottawa, Ontario, Canada, 179p. , ISBN: 0-9695851-2-8. Internet site: www.cog.ca.

NAL Call Number: SF75.3 C2 O74 2000.

Keywords: dairy cows, beef cattle, sheep, goats, pigs, poultry, rabbits, work horses, honey bees, animal husbandry, organic farming, livestock, animal health, parasites, herbal remedies, standards, comparisons to other countries, Canada .

Mackay, B.I. (2002). *Managing Drought* NSW Agriculture: Orange, Australia, 3rd. Ed., 94p., ISBN:0-7347-1445-9.

Abstract: This guide (3rd edition) provides livestock producers with information that will assist them in making decisions on how to manage droughts. The guide includes information on planning for droughts, managing and feeding livestock (sheep and beef and dairy cattle), animal health and welfare, farm management, caring for the land during drought and key services and assistance available to farmers. The guide is not intended to be a complete manual on running the farm during drought. However, it provides some basic information for producers to consider before making decisions on how to manage droughts.

Keywords: beef cattle, dairy cattle, sheep, health, husbandry, production, welfare, feeding, disasters, drought, farm management, livestock farming, sheep feeders. Copyright© 2003, CAB International

Marshall, T.T.; Hoover, T.S.; Reiling, B.A.; Downs, K.M. (1998). **Experiential learning in the animal sciences: effect of 13 years of a beef cattle management practicum.** *Journal of Animal Science* 76(11): 2947-2952. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: As the source of students shifts from rural to urban and suburban communities, students entering agricultural programs have less practical livestock experience. The career goals indicated by most of these students require knowledge of and experience with practical applications of their course work. The objective of this study was to examine the profile of students enrolled in an experiential beef cattle course 1) to describe the demographic and occupational characteristics of students enrolled and 2) to assess the perceived value of course activities to graduates completing the course as related to their skill attainment and career development. The questionnaire was sent to all 312 students who were enrolled in the course from 1983 to 1996. Over 61% of the respondents indicated they had enrolled in the course to gain experience working with beef cattle. Over 39% took the course to enhance their application to the College of Veterinary Medicine. When asked to rate the value of the course, as it related to skill development, they noted it was most helpful in teaching cattle handling skills, growth performance measurement, live animal evaluation, nutritional management, carcass and meat product value determination, and breed identification.

Keywords: agricultural education, animal husbandry, curriculum, students, career education, career planning, learning, professional competence, growth, performance, evaluation, identification, surveys.

McAllister, T.A.; Gibb, D.J.; Kemp, R.A.; Huisma, C.; Olson, M.E.; Milligan, D.; Schwartzkopf-Genswein, K. S. (2000). **Electronic identification: applications in beef production and research.** *Canadian Journal of Animal Science* 80 (3): 381-392, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: beef production, research, health, disease, electronic individual identification, traceback systems, technology, data collection in natural production environments, temperature, pH, body weight, feed intake, electronics, transponders, Canada.

Morris, C.A.; Mackay, A.D. (2002). **Moving towards low-chemical farming with sheep and cattle: The potential of a breeding approach.** *Proceedings of the New Zealand Society of Animal Production*, pp. 81-85, ISSN: 0370-2731.

NAL Call Number: 49.9 N483.

Keywords: cattle, sheep, beef cattle industry, sheep industry, heritability, livestock farming, low chemical farming.

National Research Council (2000). **Nutrient Requirements of Beef Cattle** Subcommittee on Beef Cattle Nutrition, Committee on Animal Nutrition, Board on Agriculture, National Research Council, National Academy Press: Washington, D.C., 7th rev. ed., 232 p., ISBN: 0309069343. **NAL Call Number:** SF203 .N88 2000.

Keywords: energy, protein, growth, body reserves, reproduction, minerals.

Phillips, C. (2002). **Cattle Behaviour and Welfare: Second Edition** Blackwell Science: Oxford, UK, 264p., ISBN: 0-632-05645-2.

NAL Call Number: SF202.5 P45 2002.

Keywords: play behavior, social behavior, nutritional behavior, reproductive behavior, resting behavior, locomotion, adaptation, perception, cognition, selective breeding, welfare, human animal relationship, welfare, measuring welfare, welfare of dairy cows, disease, hunger, malnutrition, milking, housing, tail docking, welfare of beef cattle and draft oxen, housing, pasture, dystocia, welfare of calves, calf behavior, housing, handling, veal calves, welfare of cattle during transport, marketing, slaughter, stunning, ritual slaughter.

Smith, B.J.(1998). **Moving' Em: A Guide to Low Stress Animal Handling** The Graziers Hui: Kamuela, Hawaii, 352 p.

NAL Call Number: SF202.7 S65 1998

Keywords: handling, herding, driving, stockmanship, stress, history, culture, senses, perception, social behavior.

Thomas, H.S. (1998). **Guide to Raising Beef Cattle** Storey Books Pownal, Vt. 343 p., ISBN: 1580173276.

NAL Call Number: SF207 .T47 1998b.

Keywords: breeds, genetics, handling, behavior, buying, selling, pasture, fencing, facilities, feeding, health, growing and breeding heifers, care of the cow, care of the calf, weaning, breeding, Cooperative Extension resources, breed organizations.

Thomas, V.M. (1992). **Beef Cattle Production: An Integrated Approach** Waveland Press: Prospect Heights, IL, 270p., ISBN: 0881336602.

Keywords: breeds, selection, breeding programs, reproduction, feeding, health, calf management, pasture and range management, facilities.

Newham, L. (1994). **Beef Cattle: Breeding, Feeding and Showing** Inkata Press: Chatswood, Australia, 148 p.

NAL Call Number: SF207 N48 1994.

Keywords: breeding, conformation, genetics, feeding, health, showing, show ring protocol, preparation for the show ring.

Northcutt, S.L.; Dolezal, H.G.; Gill, D.R. (1996). **Feeder cattle specifications for the twenty, first century.** *Journal of Animal Science* 74 (SUPPL. 1):5, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: body weight, carcass merit, feed efficiency, genetics, marketing, performance, selection.

Nova, V.; Jezkova, A.; Stadnik, L. (2002). **Indicators of economic efficiency in beef cattle breeding.** [Wskazniki ekonomicznej hodowli bydla ras miesnych.] *Biuletyn Informacyjny Instytut Zootechniki* 40 (2): 259-269, ISSN: 0209-2492.

NAL Call Number: SF1 K7.

Keywords: breed, Aberdeen-Angus, Charolais, Limousin, breed comparisons, body weight, daily weight gains, growth, reproductive efficiency, economic efficiency, Polish language.

Nygaard, H.; Stendal, M.; Flyve, J.C. (2000). **Annual Report 1999. National Committee on Danish Cattle Husbandry.** National Committee on Dairy Cattle Husbandry. Aarhus, Denmark, 51 p.

Keywords: dairy cattle, beef cattle, sheep, goats, research, animal husbandry, milk production, feeding, milking, calving, breeding, milk yield, Denmark.

Olson, K.E.; Baumgardt, B.R.; Sapp, C.L.; Glenn, B.P. (2002). **The ARPAS-FASS-AAA animal care project.** *Journal of Dairy Science* 85 (Supplement 1):168, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: beef cattle, chicken, broiler, layer, dairy cattle, human, consumer, pig, sheep, turkey, animal care, handling, public education, well-being.

Owens, F.N. (1997). **Sources of animal science research information: usefulness and reliability.** *Journal of Animal Science* 75(2):331-8. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Fifty-two animal scientists (8 private consultants, 22 feed industry representatives, 22 university personnel) were surveyed regarding frequency of use and reliability of information from 27 different publications and information sources. Among the information sources, these scientists (6 dairy specialists, 25 beef cattle specialists, 17 swine specialists, 4 dealing with multiple species) most frequently scanned Feedstuffs, the Journal of Animal Science, National Research Council (NRC) species bulletins, abstracts from regional and national meetings of either ASAS or ADSA, annual reports from experiment stations, and proceedings from state nutrition conferences. Differences among species specialties were detected: dairy specialists read the Journal of Dairy Science, abstracts from ADSA meetings, Dairy Herd Management, Hoard's Dairyman quite extensively; beef specialists read Beef and National Cattleman frequently; and swine specialists used the Pfizer Conference, National Hog Farmer, and Pork 95. Frequency of use rankings of publications were surprisingly similar for feed industry and university specialists; however, private consultants tended to use certain publications (Professional Animal Scientist, Feed Management, Beef Today) to a greater degree. For reliability, Journal of Animal Science, Journal of Dairy Science, NRC

bulletins, the Professional Animal Scientist, Pfizer Report, and reports from ASAS and ADSA meetings received the highest rankings, and university workers ranked reliability of NRC publications and Animal Feed Science and Technology higher than feed industry personnel. Regarding timeliness of information, Feedstuffs, National Hog Farmer, Pork 95, and reports from state nutrition conferences ranked best, and NRC bulletins, Journal of Animal Science, and Journal of Dairy Science ranked lowest. Applicability of information was correlated with frequency of use ($r = .38^{**}$) and presumed reliability ($r = .59^{**}$). Asked whether some formal appraisal of articles appearing in the popular press by a panel of specialists would be desirable, 88% of the scientists, especially private consultants and university personnel, favored or were neutral toward pre- or postpublication appraisal. Mechanisms to institute such an appraisal system are outlined and ethical responsibilities of researchers, reviewers, administrators, and societies related to research information are discussed.

Petit, M.; D'Hour, P. (Jan.1997). **Adaptation of suckling cattle to difficult nutritional environment. Hardy breeds, biological diversity and land management. Examples carried out in the centre INRA (Institut national de la recherche agronomique) of Clermont-Ferrand - Theix (France).** [Adaptation de bovins allaitants a des milieux nutritionnels difficiles. Races rustiques, diversite biologique et gestion de l'espace. Exemples d'etudes realisees sur le centre INRA (Institut national de la recherche agronomique de Clermont-Ferrand - Theix.)] In: *Domestic Animals and Land Management [Animaux Domestiques et Gestion De L'espace]* Institut National de la Recherche Agronomique, Paris (France). Delegation Permanente a l'Environnement, Federation des Parcs Naturels Regionaux: Paris, France, No. 11, pp. 57-60, ISSN: 1257-4627. **Keywords:** environmental factors, adaptation, grazing, feed intake, breeds, Auvergne, French language, France.

Pihamaa, P.; Pietola, K. (2002). **Optimal beef cattle management under agricultural policy reforms in Finland.** *Agricultural and Food Science in Finland* 11 (1): 3-11, ISSN: 1239-0992.

NAL Call Number: S3 A335.

Keywords: agricultural policy, beef cattle, beef production, carcass weight, feeding, husbandry, mathematical models, prices, production costs, returns, subsidies, profit, Finland

Reed, B.K.; Reed, S.N.K. (2002). **Increasing level of cooperative learning improves student performance in a beef cattle production course.** *Journal of Animal Science* 80 (Supplement 2): 33, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cattle, human, student, beef cattle production course, classroom attendance, cooperative learning, student performance.

Reynnells, R.; Blake, J. (2002). **Future Trends in Animal Agriculture: Standards for Food Animal Production: Status, Well-being, and Social Responsibility. Proceedings, September 18, 2002, Washington, DC.** Available online at:
<http://www.nal.usda.gov/awic/farmanimals/foodanim.pdf>

NAL Call Number: aSF51 F88 2002

Keywords: livestock, poultry, standards, future plans, farm representatives, commodity organizations, specialty markets.

Roderick, S.; Short, N.; Hovi, M. (1996). **Organic Livestock Production: Animal Health and Welfare Research Priorities** Department of Agriculture, University of Reading: Reading, UK, 30p.

Keywords: dairy cattle, beef cattle, cows, ewes, broilers, egg production, transport of animals, disease prevention, surveys, mastitis, ectoparasites, dermatomycoses, animal diseases, organic farming, animal welfare, animal health, hosts, parasites, helminths, United Kingdom.

Sasaki, Y. (2001). **Beef cattle breeding and its trend in Japan.** *Asian-Australasian Journal of Animal Sciences* 14 (Special Issue): 111-122, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: breed, Japanese Black, Japanese Brown-Kumamoto, Kouchi, Japanese Shorthorn, Japanese Polled, Aberdeen Angus, Hereford, WAGYU., judging, good visual quality, soft and elastic hides, fine and soft hair, good horn, fine bones in legs, clean-cut face, performance testing, progeny testing, meat productivity, breeding scheme, field recording, carcass traits, genome analysis, genetic method, marker-assisted selection, breeding method, genetic method.

Small, J.A.; McCaughey, W.P. (1999). **Beef cattle management in Manitoba.** *Canadian Journal of Animal Science* 79(4): 539-544.

NAL Call Number: 41.8 C163.

Abstract: A survey was conducted to document general characteristics of beef cattle management and identify producer concerns in Manitoba. The survey was divided into five sections: (i) characterization of farm operation, (ii) winter management, (iii) forage and pasture management, (iv) reproductive management and (v) factors limiting profitability and the use of non-traditional management tools. The survey provided base information for measuring change in the industry and identified cost of production pasture, and reproduction as the top three factors that producers consider limiting the profitability of beef operations in Manitoba.

Keywords: husbandry, farm surveys, geographical variation, beef production, winter, grassland management, forage, reproduction, livestock numbers, profitability, Manitoba, Canada.

Smeaton, D.C.; Bown, M.D.; Clayton, J.B. (2000). **Optimum live weight, feed intake, reproduction, and calf output in beef cows on North Island hill country, New Zealand.** *New Zealand Journal of Agricultural Research* 43 (1): 71-82, ISSN: 0028-8233.

NAL Call Number: 23 N4892.

Keywords: beef cows, Hereford X Friesian, breed, live weight profiles, dry matter intake, slow release chromic oxide capsules, fecal grab sampling, in vitro digestibility, daily gain, calf weaning weight, New Zealand.

Smith, D.L.; Wilson, L.L.; Nordstrom, P.A.; Richards, M.J. (1998). **Swine and beef producer evaluation of handling, transportation, and other management factors.** *The Professional Animal Scientists* 14(4): 201-206. Online version:

<http://www.arpas.uiuc.edu/pas/pas.html>

NAL Call Number: SF51 P76.

Keywords: pig farmers, farmers' attitudes, beef production, change, stress factors, pigs, beef cattle, animal welfare, transport of animals, dark cutting meat, porcine stress syndrome, transport personnel, livestock transporters, Pennsylvania.

Smith, R.A. (2000). *Proceedings of the Thirty-Third Annual Conference, American Association of Bovine Practitioners, Rapid City, South Dakota, USA, September 21-23, 2000*, 190p.

Keywords: conferences, dairy cattle, cows, beef cattle, feeding, calf feeding, cattle feeding, calves, feeds, animal husbandry, animal welfare, diseases, injuries, milk, reproduction.

Spedding, C.; Esslemont, R.; Kossaibati, M.A.; Naish, D.; Scott, P.; Maclean, C.; Suckling, A.; Batty, A. (1996). *Welfare Problems of Food Animals and Horses: 2. The Economics of Food Animal Welfare* Royal Society for the Prevention of Cruelty to Animals, UK, Animal Health Trust, UK, British Veterinary Association Animal Welfare Foundation, 29 p.

Keywords: labeling, quality labelling, retail marketing, consumer behavior, subsidies, support measures, animal welfare, food marketing, conference paper, United Kingdom.

Tarocco, C. (1999). **The policy of European Union for animal protection (welfare).** [La UE guarda alla protezione degli animali (benessere).] *Informatore Zootecnico* 46(2): 22-24, ISSN: 0020-0778.

Keywords: animal welfare, regulations, vocational training, behavior, animal husbandry methods, animal husbandry equipment, physical activity, European Union, Italian language, Italy.

Vecchietini, M.; Giardini, A.(1999). **Animal welfare and protection of the environment (beef cattle husbandry).** [Benessere animale e tutela ambientale (allevamento dei bovini da carne).] *Informatore Zootecnico* 46(3): 55-56, 73-76, ISSN: 0020-0778.

Keywords: animal welfare, meat yield, environmental protection, farmyard manure, liquid manures, pollutants, animal husbandry, animal husbandry methods, stocking density, Italian language, Italy.

Wierenga, H.K.; Blokhuis, H.J. (1997). **Cattle welfare, science and policy.** *Presented at the XIX World Buiatrics Congress, Edinburgh, UK, July 8-12, 1996, Vol.32, No.31.2*, p. 16-18, ISSN: 0524-1685.

Keywords: animal welfare, veal calves, beef cattle, dairy cows, health, behavior, housing, milk production, transport of animals.

Wilkins, J.F.; McKiernan, W.A. (1998). *Beef-the path forward. NSW Agriculture Beef Products Conference, Armidale, Australia, November 1998*, Library, NSW Agriculture: Orange, Australia, 219 p., ISBN: 0-7347-1005-4.

Keywords: meat production, meat quality, genetics, nutrition, economics, animal behavior, Australia.

Verhoog, H. (2000). **Defining positive welfare and animal integrity.** In: *Diversity of Livestock Systems and Definition of Animal Welfare. Proceedings of the Second NAHWOA Workshop, Cordoba, Spain, 8-11 January 2000*, Hovi, M.; Garcia Trujillo, R. (Eds.), University of Reading Library (RUL): Reading, UK , pp.108-119 120-134, ISBN: 0-7049-1092-6. Available online at: <http://www.veeru.reading.ac.uk/organic/proceedings.htm>

Keywords: animal welfare, livestock, organic farming.

Webster, A.J.F (2001). **Farm animal welfare: the five freedoms and the free market.** *The Veterinary Journal* 161(3) 229-237, ISSN: 1090-0233.

NAL Call Number: SF601.V484.

Keywords: review, scientific, ethical and economic factors, animal welfare, ethical matrix, wellbeing, autonomy, fitness, suffering, husbandry, legislation, free market, quality assurance schemes, quality control, independent audit.

Younie, D.; Wilkinson, J.M. (2001). *Organic Livestock Farming. Papers Presented at Conference Held at the Heriott-Watt University, Edinburgh and at the University of Reading, UK, February 9-19, 2001*, 179 p., Chalcombe Publications: Lincoln, UK, ISBN: 0-948617-45-4.

Keywords: beef, dairy, swine, sheep, poultry, organic livestock farming, organic meat, marketing, health, animal welfare, consumer attitudes, grassland management.

Health

Aarestrup, F.M. (1999). **Association between the consumption of antimicrobial agents in animal husbandry and the occurrence of resistant bacteria among food animals.**

International Journal of Antimicrobial Agents 12 (4): 279-85, ISSN: 0924-8579.

Abstract: Antimicrobial agents are used in food animals for therapy and prophylaxis of bacterial infections and in feed to promote growth. The use of antimicrobial agents for food animals may cause problems in the therapy of infections by selecting for resistance among bacteria pathogenic for animals or humans. The emergence of resistant bacteria and resistance genes following the use of antimicrobial agents is relatively well documented and it seems evident that all antimicrobial agents will select for resistance. However, current knowledge regarding the occurrence of antimicrobial resistance in food animals, the quantitative impact of the use of different antimicrobial agents on selection for resistance and the most appropriate treatment regimens to limit the development of resistance is incomplete. Surveillance programmes monitoring the occurrence and development of resistance and consumption of antimicrobial agents are urgently needed, as is research into the most appropriate ways to use antimicrobial agents in veterinary medicine to limit the emergence and spread of antimicrobial resistance.

Keywords: anti-infective agents, administration and dosage, drug resistance, multiple, meat, microbiology.

Adachi, K.; Fukumoto, K.; Nomura, Y.; et al. (1998). **Significant decrease of serum vitamin A levels in Japanese black beef steers after introduction to a farm.** *Journal of Veterinary Medical Science* 60 (1): 101-102, ISSN: 0916-7250.

NAL Call Number: SF604 J342.

Keywords: feeder steers, Japanese Black, breed, vitamin A, metabolism, serum, dietary intake, farm introduction, stress, bronchitis, diarrhea.

Adachi, K.; Kawano, H.; Tsuno, K.; et al. (1997). **Values of the serum components in Japanese black beef steers at farms with high productivity and low frequencies of disease and death in Miyazaki Prefecture.** *Journal of Veterinary Medical Science* 59 (10): 873-877, ISSN: 0916-7250.

NAL Call Number: SF604 J342.

Keywords: Japanese Black, breed, metabolic profile tests, high productivity, production diseases, prevention, serum levels, lactic dehydrogenase, glutamic, oxalacetic transaminase, gamma, glutamyl transpeptidase, creatine phosphokinase, triglyceride, total cholesterol, albumin (Alb), total protein, blood urea nitrogen, magnesium, vitamin E, serum calcium, Vitamin A, death, low frequency, disease, low frequency, fattening stage, high productivity, serum components, enzymes, physiological studies.

Alfaro, C.; Diaz Villegas, C.; Tirado, H. (1999). **Sanitary conditions of a dual-purpose cattle production system in Ezequiel Zamora, Monagas State, Venezuela.[Caracterizacion sanitaria de la ganaderia doble proposito en el municipio Ezequiel Zamora del estado Monagas-Venezuela.]** *Veterinaria Tropical* 24 (2): 103-119, ISSN: 0379-8275.

NAL Call Number: SF604 V486.

Keywords: animal health, hygiene, beef cattle, dairy cattle, cattle diseases, animal husbandry, Spanish language, Venezuela.

Almeria, S.; Uriarte, J. (1999). **Dynamics of pasture contamination by gastrointestinal nematodes of cattle under extensive management systems: proposal for strategic control.** *Veterinary Parasitology* 83 (1): 37-47, ISSN: 0304-4017.

NAL Call Number: SF810 V4.

Keywords: cows, heifers, calves, epidemiological study, gastrointestinal nematode infection, pasture nematode contamination, digestive system disease, parasitic disease *Cooperia* sp., *Nematodirus* sp., *Oesophagostomum* sp., *Ostertagia* sp. *Trichostrongylus* sp., hay meadows, seasonality, mountainous areas, Spain.

Andrews, A.H. (2003). ***Bovine Medicine: Diseases and Husbandry of Cattle*** Blackwell Scientific Publications: St. Louis, 2nd. Ed., 1216p., ISBN: 0632055960.

Keywords: management, calf rearing, suckler herds, beef finishing systems, dairy farming, heifer rearing, tropical cattle management, heat stress, nutrition, alternative forages, disease, diagnosis, congenital conditions, calf diarrhea, Salmonellosis, endoparasites, respiratory diseases, trace element disorders, mastitis and teat conditions, lameness, reproductive physiology, reproductive problems, artificial insemination, embryo transfer, viral diseases, bacterial conditions, ectoparasites, metabolic disorders, alimentary conditions, welfare, housing, hygiene, biosecurity, vaccines, growth promoters in cattle, injection damage, alternative medicine, bovine surgery.

Anziani, O.S.; Guglielmone, A.A.; Schmid, H. (1998). **Efficacy of dicyclanil in the prevention of screwworm infestation (*Cochliomyia hominivorax*) in cattle castration wounds.** *Veterinary Parasitology* 76(3): 229-232, ISSN: 0304-4017.

NAL Call Number: SF810 V4.

Keywords: *cochliomyia hominivorax*, castration, pest control, sterilization, surgical operations.

Arthur, P.F.; Archer, J.A.; Melville, G.J. (2000). **Factors influencing dystocia and prediction of dystocia in Angus heifers selected for yearling growth rate.** *Australian Journal of Agricultural Research* 51 (1): 147-153, ISSN: 0004-9409.

NAL Call Number: 23 Au783.

Keywords: Angus, heifers, selection, yearling growth rate, dystocia, calf birth weight, calf survival.

Bach, S.J.; McAllister, T.A.; Veira, D.M.; Gannon, V.P.J.; Holley, R.A. (2002).

Transmission and control of *Escherichia coli* O157:H7: A review. *Canadian Journal of Animal Science* 82 (4): 475-490, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: beef cattle, dairy cattle, *Escherichia coli* O157:H7, contaminant, pathogen, bacterial disease, feces, prevention and control, transmission, manure, soil, water, flies, bacteriophage therapy, clinical techniques, vaccination, diet, geographical differences, ground beef, meat product, seasonality, Canada, Japan, United Kingdom, USA.

Ballweber, L.R.; Evans, R.R.; Siefker, C.; Johnson, E.G.; Rowland, W.K.; Zimmerman, G.L.; Thompson, L.; Walstrom, D.J.; Skogerboe, T.L.; Brake, A.C.; Karle, V.K. (2000). **The effectiveness of doramectin pour, on in the control of gastrointestinal nematode infections in cow, calf herds.** *Veterinary Parasitology* 90(1, 2): 93-102, ISSN: 0304-4017.

NAL Call Number: SF810 V4.

Keywords: beef cow, calf herds, doramectin pour, control, gastrointestinal nematodosis, fecal egg count, calf weight gain, farm location, Idaho, Mississippi.

Barham, A.R.; Barham, B.L.; Johnson, A.K.; Allen, D.M.; Blanton, J.R., Jr.; Miller, M.F. (2002). **Effects of the transportation of beef cattle from the feedyard to the packing plant on prevalence levels of *Escherichia coli* O157 and *Salmonella* spp.** *Journal of Food Protection* 65 (2): 280-283, ISSN: 0362-028X.

NAL Call Number: 44.8 J824.

Abstract: Two hundred steers and heifers from a large feedyard (65 000-head capacity) were used to determine the prevalence levels of enterohaemorrhagic *Escherichia coli* O157 (EHEC O157) and *Salmonella* spp. prior to and after shipping to a commercial packing facility. Two samples, a ventral midline hide swab and a faecal sample, were aseptically collected from each animal 2 weeks prior to the date of transportation and at the packing plant immediately after exsanguination. Samples were collected from all trailers (n=46) before animals were loaded for transport to the packing facility. The average prevalence levels of EHEC O157 on hides (18%) and in faeces (9.5%) at the feedyard decreased ($P>0.05$) at the packing plant to 4.5 and 5.5%, respectively. The average prevalence levels of *Salmonella* spp. on hides (6%) and in faeces (18%) at the feedyard increased to 89 and 46%, respectively, upon arrival at the packing plant. Average prevalence levels for EHEC O157 and *Salmonella* spp. on the trailers were 5.43 and 59%, respectively. The results of this study demonstrate that transportation may be a potential stressor for cattle, as evidenced by the increased shedding of *Salmonella* spp.

Keywords: beef cattle, heifers, steers, disease prevalence, feces, food contamination, food safety, foodborne diseases, *Escherichia coli*, *Salmonella*, hides, skins, stress factors, transport of animals. Copyright© 2003, CAB International

Barling, K.S., McNeill, J.W., Paschal, J.C., McCollum, F.T. III; Craig, T.M.; Adams, L.G.; Thompson, J.A. (2001). **Ranch-management factors associated with antibody seropositivity for *Neospora caninum* in consignments of beef calves in Texas, USA.** *Preventive Veterinary Medicine* 52 (1): 53-61, ISSN: 0167-5877.

NAL Call Number: SF601 P7.

Keywords: beef calves, *Neospora caninum* infection, parasitic disease, risk factors, questionnaire, management practices, logistic multiple-regression model, serum, seasonal calving patterns, stocking density, round bale feeder, self-contained cattle feeder, wildlife, cattle working dog, Texas, USA.

Barnett, P.V.; Carabin, H. (2002). **A review of emergency foot-and-mouth disease (FMD) vaccines.** *Vaccine* 20 (11-12): 1505-1514, ISSN: 0264-410X.

NAL Call Number: QR189 V32.

Keywords: cattle, pigs, sheep, literature review, emergency foot-and-mouth disease vaccines, viral disease, vaccination, immunization-method, clinical signs, local virus replication, spread of infection.

Beach, J.C.; Murano, E.A.; Acuff, G.R. (2002). **Serotyping and antibiotic resistance profiling of *Salmonella* in feedlot and nonfeedlot beef cattle.** *Journal of Food Protection* 65 (11): 1694-1699, ISSN: 0362-028X.

NAL Call Number: 44.8 J824.

Abstract: As part of a larger study to assess risk factors associated with hide and carcass contamination of beef cattle during transport to slaughter, a total of 281 salmonellae were isolated from 1,050 rectal, hide, carcass, and environmental samples. For feedlot cattle, salmonellae were recovered from 4.0% of rectal samples, 37.5% of hide samples, 19.0% of carcass samples, and 47.4% of environmental samples. For nonfeedlot cattle, salmonellae were recovered from 10.9% of rectal samples, 37.5% of hide samples, 54.2% of carcass samples, and 50.0% of environmental samples. Overall, the five serotypes most commonly associated with feedlot cattle and their environment were *Salmonella* Anatum (18.3% of the isolates), *Salmonella* Kentucky (17.5%), *Salmonella* Montevideo (9.2%), *Salmonella* Senftenberg (8.3%), and *Salmonella* Mbandaka (7.5%). The five serotypes most commonly associated with nonfeedlot cattle and their environment were *Salmonella* Kentucky (35.4%), *Salmonella* Montevideo (21.7%), *Salmonella* Cerro (7.5%), *Salmonella* Anatum (6.8%), and *Salmonella* Mbandaka (5.0%). Antimicrobial susceptibility testing of all of the isolates associated with feedlot cattle revealed that 21.7% were resistant to tetracycline, compared with 11.2% of the isolates associated with nonfeedlot cattle. None of the other isolates from feedlot cattle were resistant to any of other antimicrobial agents tested, whereas 6.2% of nonfeedlot cattle isolates were resistant to more than four of the antimicrobial agents tested.

Keywords: tetracycline, *Salmonella*, contaminant, pathogen, serovar Anatum, serovar Cerro, serovar Kentucky, serovar Mbandaka, feedlot, host, antibiotic resistance, cattle carcass, meat product.

Bellows, R.A.; Lammoglia, M.A. (2000). **Effect of severity of dystocia on cold tolerance and serum concentrations of glucose and cortisol in neonatal beef calves.** *Theriogenology* 53 (3): 803-813, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5.

Keywords: dystocia, effects on, neonatal calves, rectal temperature, glucose concentrations, blood sampling, body weight, cold temperatures, shivering scores, cold tolerance.

Bengtsson, B.; Niskanen, R.; Forslund, K. (1999). **Euthanasia of adult beef cattle by intravenous injection of pentobarbital sodium. [Avlivning av vuxna notkreatur med pentobarbitalnatrium i etanollosning.]** *Svensk Veterinartidning* 51 (13): 633-636, ISSN: 0346-2250.

NAL Call Number: 41.9 SV23.

Keywords: beef cattle, adult, intravenous injection, pentobarbital, cardiovascular system, ethanol, euthanasia, safety, xylazine, heart diseases, culling, animal welfare, dosage, injectable anaesthetics, analgesics, sedation, Swedish language.

Bingham, H.R.; Morley, P.S.; Wittum, T.E.; Bray, T.M.; Ellis, J.A.; Queen, W.G.; Shulaw, W.P. (2000). **Effects of 3-methylindole production and immunity against bovine respiratory syncytial virus on development of respiratory tract disease and rate of gain of feedlot cattle.** *American Journal of Veterinary Research* 61(10):1309-14.

NAL Call Number: 41.8 Am3A.

Keywords: mixed-breed beef cattle, feedlot cattle, immunity, bovine respiratory syncytial virus (BRSV), vaccination, rate of gain, health, growth performance.

Bingham, H.R.; Wittum, T.E.; Morley, P.S.; Bray, T.M.; Sarver, C.F.; Queen, W.G.; Shulaw, W.P. (2000). **Evaluation of the ability of orally administered aspirin to mitigate effects of 3-methylindole in feedlot cattle.** *American Journal of Veterinary Research* 61(10):1209-13.

NAL Call Number: 41.8 Am3A.

Keywords: 3-methylindole (3MI)-induced respiratory tract disease, reduced rate of gain, orally administered dose of aspirin, respiratory tract disease, lungs evaluated at slaughter, gross pulmonary lesions.

Boadi, D.A.; Wittenberg, K.M.; Kennedy, A.D. (2002). **Validation of the sulphur hexafluoride (SF6) tracer gas technique for measurement of methane and carbon dioxide production by cattle.** *Canadian Journal of Animal Science* 82 (2):125-131, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: methane (CH₄), carbon dioxide (CO₂), production, crossbred yearling beef heifers, air pollutant, excretion, open-circuit hood calorimetry, alfalfa, barley.

Bouet, J.M.; Seegers, H.; Beaudreau, F.; Lopez, C. (1999). **Risk factors for respiratory disorders of calves in beef cattle herds. [Facteurs de risque des maladies respiratoires des veaux dans les élevages de vaches allaitantes de vendée.]** In: *6emes rencontres autour des recherches sur les ruminants, P vitamin deficiencies aris, les 1er et 2 decembre 1999*, Institut l'Elevage: Paris, France, pp. 187-190, ISBN: 2-84148-035-6.

Keywords: beef calves, respiratory diseases, risk factors, cattle housing, French language.

Brambilla, G.; Fiori, M.; Pierdominici, E.; Antonucci, G.; Giorgi, P.; Ramazza, V.; Zucchi, M. (1998). **A possible correlation between the blood leukocyte formula and the use of glucocorticoids as growth promoters in beef cattle.** *Veterinary Research Communications* 22(7): 457-465, ISSN: 0165-7380.

NAL Call Number: SF601 V38.

Keywords: young bulls, heifers, glucocorticoids, growth promoters, illegal use, ELISA, liquid chromatography, mass spectrometry, chemical analysis, animal welfare, lymphocytes, analytical methods, blood chemistry, certification., Italy.

Busato, A.; Steiner, L.; Martin, S.W.; Shoukri, M.M.; Gaillard, C. (1997). **Calf health in cow-calf herds in Switzerland.** *Preventive Veterinary Medicine* 30(1):9-22.

NAL Call Number: SF601 P7.

Keywords: beef calves, Angus crossbreds, animal health, extensive beef farms, disease frequency, economic impact, calf diseases, risk factors, weight gain, longitudinal study, farm management data, questionnaire, birth and weaning weights, clinical diagnosis, treatment costs, postmortem examination.

Caldow, G.L.; Crawshaw, M.; Gunn, G.J. (1998). **Herd health security in the suckler herd.** *Cattle Practice* 6(3): 175-179, ISSN: 0969-1251.

NAL Call Number: SF961 C37.

Keywords: beef cattle, health, animal husbandry, disease control, disease transmission, quarantine, disease prevention, cattle diseases, animal movement.

Carson, C.; McKay, J.S.; Brooks, H.W.; Kelly, D.F.; Stidworthy, M.F.; Wibbelt, G.; Morgan, K.L. (2001). **Establishment and maintenance of a longitudinal study of bovine spongiform encephalopathy (the ULiSES scheme).** *Preventive Veterinary Medicine* 51(3-4): 245-57.

NAL Call Number: SF601 P7.

Keywords: Aberdeen Angus, breed, bovine spongiform encephalopathy (BSE) prevention and control, epidemiology, post-mortem samples of nervous tissue, peripheral lymphoid tissue, striated muscle, slaughter, pathology, England.

Cebra, C.K.; Cebra, M.L.; Ikede, B.O. (1999). **Congenital joint laxity and disproportionate dwarfism in a herd of beef cattle.** *Journal of the American Veterinary Association* 215(4):519-21, 483.

NAL Call Number: 41.8 Am3.

Keywords: congenital disease, disproportionate dwarfism, excessive extension of metacarpophalangeal and metatarsophalangeal joints, calf survival, radiographic evaluation, carpal and tarsal bones, chondrodystrophy, cause, feeding of dry, spoiled silage.

Chenoweth, P.J.; Vargas, C.A.; Rae, D.O.; Saltman, R.L.; Genho, P.C.; Crosby, G. (1997). **Effects of an oral antibiotic on fertility traits in range beef cows in Florida.** *Journal of Animal Science* 75 (SUPPL. 1): 249, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Simmental x Brahman, Angus x Brahman, Hereford x Brahman, crossbred cows, chlortetracycline, antibiotic fertility traits, oral antibiotic effects.

Chirase, N.K.; Greene, L.W.; Graham, G.D.; Avampato, J.M. (2001). **Influence of clostridial vaccines and injection sites on performance, feeding behavior, and lesion size scores of beef steers.** *Journal of Animal Science* 79(6): 1409-1415. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Several clostridial vaccines are currently being used in the beef cattle industry. Of greatest concern is altering the location and route of administration of these vaccines to reduce injection-site lesions while maintaining seroconversion. Two experiments were conducted to determine the effect of clostridial vaccines and injection sites on the performance, feeding behavior, and lesion size scores of beef steers. In Exp. 1, 80 crossbred beef steers (BW 237 +/- 3.2 kg) were allotted randomly into five groups and given 14d to adapt to the feed and individual feed intake-monitoring devices (Pinpointer devices) before starting the study. Each group was assigned randomly to one of the following vaccination treatments: 1) control (sterile saline water), 2) Alpha-7 Ear (A7E), 3) Alpha-7 Prescapula (A7P), 4) Vision-7 Prescapula (V7P), and 5) Ultrabac-7 Prescapula U7P). All vaccines were injected s.c. in the ear or prescapular region, and injection sites were palpated on d 0 and 28 (Exp. 1) and on d 63 and 91 (Exp. 2). The protocol for Exp. 2 was exactly the same as for Exp. 1 except treatments included control, A7P, Alpha-CD Ear (ACDE), Alpha-CD Prescapula (ACDP), Fortress-7 Prescapula (F7P), and V7P. Also, control and steers receiving F7P and V7P were revaccinated on d 63 and palpated on d 91. Results of Exp. 1 indicated that the A7E and U7P steers had a feed intake lower ($P < 0.01$) than all other treatment groups. The ADG of the A7P and A7E steers were not different ($P > 0.05$) from those of the control steers. The gain:feed ratio of the A7E steers was 41% higher ($P < 0.01$) than that of the V7P steers (Exp. 1). The results of Exp. 2 indicated that the control, ACDP, and V7P steers had greater ($P < 0.01$) ADG than all other treatment groups, sizes differed by vaccine and injection site in both experiments. These data suggest that vaccinating beef steers s.c. in the ear produced gain: feed ratios and lesion size scores that were similar to prescapular vaccinations. However, more research is required to determine the immune response but the gain:feed ratios were not different ($P > 0.05$) among all treatment groups. Lesion of vaccinating cattle in the ear.

Keywords: steers, clostridium, spatial variation, vaccines, performance, feeding behavior, lesions, size, feed intake, subcutaneous injection, ears, application date, live weight gain, feed conversion efficiency, immune response.

Corwin, R.M. (1997). **Economics of gastrointestinal parasitism of cattle.** *Veterinary Parasitology* 72 (3, 4): 451-457, ISSN: 0304-4017.

NAL Call Number: SF810 V4.

Keywords: Dictyocaulus, viviparus, parasite, Ostertagia, ostertagi, parasite, gastrointestinal parasitism, anthelmintic programs, immunity, control measures, pasture management, economic effects, weight gain, reproduction, lactation, forage use.

Daniels, M.J.; Ball, N.; Hutchings, M.R.; Greig, A. (2001). **The grazing response of cattle to pasture contaminated with rabbit faeces and the implications for the transmission of paratuberculosis.** *Veterinary Journal* 161(3): 306-13.

NAL Call Number: SF601 V484.

Keywords: Transmission of Mycobacterium, paratuberculosis (or Johne's disease), contamination via fecal-oral route, grazing behavior, monitoring, transponder, field rotation.

Davies, M.H.; Hadley, P.J.; Stosic, P.J.; Webster, S.D. (2000). **Production factors that influence the hygienic condition of finished beef cattle.** *Veterinary Record* 146(7): 179-83.

NAL Call Number: 41.8 V641.

Keywords: abattoirs, dirty beef cattle, age differences, surveys, farm of origin, transport and lairage, feed type, coat length, clipping, journey distance, United Kingdom.

Davis, J.R.; Apple, J.K.; Hellwig, D.H.; Kegley, E.B.; Pohlman, F.W. (2002). **The effects of feeding broiler litter on microbial contamination of beef carcasses.** *Bioresource Technology* 84 (2): 191-196, ISSN: 0960-8524.

NAL Call Number: TD930 A32.

Keywords: Salmonella typhimurium, Escherichia coli O157:H7, carcass contamination, foodborne pathogen, grazing, microbial contamination, bioresource technology, broiler litter feeding.

Daxenberger, A.; Lange, I.G.; Meyer, K.; Meyer, H.H.; Daxenberger, A.; Lange, I.G.; Meyer, K.; Meyer, H.H. (2000). **Detection of anabolic residues in misplaced implantation sites in cattle.** *Journal of AOAC International* 83(4): 809-19.

NAL Call Number: S583 A7.

Keywords: heifers, anabolic preparations, off-label injection sites, Synovex H, Finaplix H, Implus S, Component, EC Revalor H, administration and dosage, tissue analysis, food contamination.

De Meerschman, F.; Speybroeck, N.; Berkvens, D.; Rettignera, C.; Focant, C.; Leclipteux, T.; Cassart, D.; Losson, B. (2002). **Fetal infection with Neospora caninum in dairy and beef cattle in Belgium.** *Theriogenology* 58 (5): 933-45, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5.

Abstract: Neospora caninum is a protozoan parasite, which causes fetal and neonatal mortality in livestock and companion animals. In 224 abortions in Belgian cattle, different diagnostic methods were used to demonstrate infection, and the presence of N. caninum. An indirect fluorescent antibody test (IFAT) was used to analyze fetal and maternal sera and

immunohistochemistry (IHC) was performed when lesions consistent with neosporosis were observed in the brain, heart or liver. Twenty dairy cattle sera out of 70 (29%) and 13 beef cattle sera out of 93 (14%) were positive by IFAT. A positive titer to *N. caninum* was found in seven and three fetuses born to beef and dairy cows, respectively. Lesions consistent with *N. caninum* infection were observed in 17 fetuses. Of nine positive beef fetuses, five were confirmed by IHC while, all but one dairy fetus were confirmed using the same technique. Age had no influence on the serological status of the mother ($P = 0.486$) whereas husbandry system had a borderline influence ($P = 0.082$). However, a strong association ($P = 0.004$) between the level of antibodies in the dam and the occurrence of lesions in the fetus was observed and lesions were more prominent in dairy than in beef fetuses. Additionally, the distribution of intra-cerebral lesions was more extensive in dairy than in beef fetuses ($P < 0.0001$). Age and serological status of the fetus were found to influence the occurrence of lesions in beef fetuses (both $P < 0.001$) but no such significant relationships could be demonstrated in dairy fetuses. The study indicated that *N. caninum* must be considered as an important cause of bovine abortion in Belgium.

Keywords: pregnancy, diseases, parasitology, coccidiosis, *Neospora caninum*, protozoan parasite, fetal diseases, fluorescent antibody technique, heart, liver, brain, pathology, necrosis.

Driemeier, D.; Gomes, M.J.P.; Moojen, V.; et al. (1997). **Clinic, pathological aspects in the natural infection of bovine respiratory syncytial virus (BRVS) in extensive management of cattle in Rio Grande do Sul, Brazil.** *Pesquisa Veterinaria Brasileira* 17 (2): 77-81, ISSN: 0100-736X.

NAL Call Number: SF756.37 B7 P5.

Keywords: beef cattle, disease, Bovine Respiratory Syncytial (BRSV) infection, viral infection, chronic cough, severe dyspnea, pathology, microbiology, serology, extensive management, Portuguese language, Brazil.

Dubeski, P.L.; Owens, F.N.; Song, W.O.; Coburn, S.P.; Mahuren, J.D. (1996). **Effect of B vitamin injections on plasma B vitamin concentrations of feed-restricted beef calves infected with bovine herpesvirus-1.** *Journal of Animal Science* 74(6): 1358-1366. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: For nonruminants, stress and disease greatly increase requirements for vitamin B6, folic acid, pantothenic acid, and ascorbate. The effects of feed restriction, virus infection, and vitamin injections on plasma concentrations of B vitamins critical to the immune response were evaluated. Twelve beef steer calves, 6 to 8 mo of age, were fed below maintenance for 17 d and deprived of food for 3 d during a 20-d period after weaning. They then were inoculated intranasally with live attenuated bovine herpesvirus-1 (BHV-1). Six calves received saline injections and six received injections of a B vitamin mixture and ascorbate every 48 h for 14 d before and 14 d after inoculation. A mild respiratory infection developed in all calves 4 to 5 d after inoculation. In control calves, restricted intake and food deprivation decreased plasma vitamin B6 and pantothenate and increased vitamin B12 but did not affect folic acid and ascorbate concentrations. Vitamin injections increased plasma concentrations of vitamin B6, folic acid, vitamin B12, pantothenic acid, and ascorbate ($P < .002$). Plasma concentrations of vitamin B6, vitamin B12, pantothenic acid, and ascorbate, but not folic acid, were markedly reduced in all calves during the BHV-1 infection ($P = .001$). The vitamin

B6, pantothenic acid, vitamin B12, and ascorbate status of stressed calves may affect their immune response to vaccination or infection.

Keywords: calves, beef cattle, bovine herpesvirus, experimental infections, restricted feeding, stress response, thiamin, riboflavin, nicotinic acid, folic acid, pantothenic acid, vitamin b12, pyridoxine, blood plasma, pyridoxal, 4-pyridoxic acid, pyridoxal phosphate, ascorbic acid, intramuscular injection.

Duff, G.C.; Walker, D.A.; Malcolm-Callis, K.J.; Wiseman, M.W.; Hallford, D.M. (2000). **Effects of preshipping vs. arrival medication with tilmicosin phosphate and feeding chlortetracycline on health and performance of newly received beef cattle.** *Journal of Animal Science* 78(2): 267-74. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef calves, feedlot, tilmicosin phosphate, feeding chlortetracycline, health, average daily gain, daily dry matter intake, bovine respiratory disease (BRD).

Durham, P.J.K.; Paine, G.D. (1997). **Serological survey for antibodies to infectious agents in beef cattle in northern South Australia.** *Australian Veterinary Journal* 75(2): 139-140.

NAL Call Number: 41.8 Au72.

Keywords: serological surveys, monitoring, animal husbandry, antibodies, vaccination, pathogens, geographical distribution, detection, South Australia.

Echternkamp, S.E.; Gregory, K.E. (1999). **Effects of twinning of gestation length, retained placenta, and dystocia.** *Journal of Animal Science* 77 (1): 39-47, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cows, calves, twin birth, reproductive system disease, dystocia, incidence, retained placenta, conception rate, gestation length, neonatal survival, parity, postpartum interval.

Elder, R.O.; Keen, J.E.; Siragusa, G.R.; et al. (2000). **Correlation of enterohemorrhagic Escherichia coli O157 prevalence in feces, hides, and carcasses of beef cattle during processing.** *Proceedings of the National Academy of Sciences of the United States of America* 97 (7): 2999-3003, ISSN: 0027-8424.

NAL Call Number: 500 N21P.

Keywords: feeder cattle, slaughter, survey, frequency, enterohemorrhagic Escherichia coli, strain, O157:H7, carcass contamination, sanitary procedures.

Evermann, J.F.; Ridpath, J.F. (2002). **Clinical and epidemiologic observations of bovine viral diarrhea virus in the northwestern United States.** *Veterinary Microbiology* 89 (2-3): 129-139, ISSN: 0378-1135.

NAL Call Number: SF601 V44.

Abstract: Retrospective analyses of cases from which bovine viral diarrhea virus (BVDV) was isolated from 1980 to 2000 were conducted. These cases originated from the northwestern US and included both beef and dairy cattle. The results indicated that there was a shift in diseases associated with BVDV infection and in the animal age at onset of disease. Comparative results from the 1980 data indicated a low fetal infection rate (<5%), followed by steady increases of clinical cases and peaking at 6 months (30%). By 2000, the shift of BVDV cases was noticeable and indicated a biphasic occurrence of disease. The first phase was fetal infections, which increased to >25%, followed by a second phase at 6 months

(>35%). Phylogenetic analysis was conducted on selected isolates from the time period 1998-2000 (n=54). There were representative viral isolates from the two genotypes (BVDV1 and BVDV2), as well as subgenotypes, BVDV1a and BVDV1b. The types were further correlated with the clinical manifestation, which were reported as mucosal disease, persistently infected (PI)-poor doer, and abortion-open cows. The results indicated that BVDV were distributed throughout the clinical spectrum of disease, with BVDV2 representing the greatest frequency of isolation, and the greatest association with abortion-open cows. When the BVDV genotypes and subgenotypes were categorized into early (<100 days gestation) versus late (>100 days gestation) fetal infections, there was an inverse relationship noted. It was observed that BVDV1a was associated least with early infection (14%) and most with late infections (86%). BVDV1b was intermediate, followed by BVDV2, which was associated more with early infections (45%) and less with late infections (55%) when compared with BVDV1a and BVDV1b.

Keywords: epidemiology, bovine viral diarrhea virus, pathogen, cow, beef cattle, abortion.

Farrow, C.S. (1999). **Bovine Medical Imaging** W.B. Saunders: Philadelphia, PA, Series: The Veterinary Clinics of North America. Food Animal Practice, 215-446 p.

NAL Call Number: SF601 V535 v. 15, no. 2.

Keywords: cattle, diseases, diagnosis, veterinary radiology.

Fleischer, K.; Schmidt, G.; Rumsey, T.S.; Fritsche, S.; Steinhart, H.; Kahl, S.; Elsasser, T.H. (2003). **Comparison of steroid hormone patterns in different fat tissues of Synovex-S implanted and control steers.** *European Food Research and Technology* 216 (2): 99-103, ISSN: 1438-2377.

NAL Call Number: TX341 Z45.

Keywords: Synovex-S, effects, steroid hormones, Kruskal-Wallis-H-test, exogenous steroid administration, chromatography mass spectrometry, laboratory techniques, spectrum analysis techniques.

Fritschi, L.; Johnson, K.C.; Kliewer, E.V.; Fry, R. (2002). **Animal-related occupations and the risk of leukemia, myeloma, and non-Hodgkin's lymphoma in Canada.** *Cancer Causes and Control* 13 (6): 563-571, ISSN: 0957-5243.

Keywords: human health, occupational hazards, occupational health, blood disorders, epidemiology, exposure, farmers, leukemia, myeloma, non-Hodgkin's lymphoma, disease incidence, Canada.

Frisch, J.E.; O'Neill, C.J. (1998). **Comparative evaluation of beef cattle breeds of African, European and Indian origins. 2. Resistance to cattle ticks and gastrointestinal nematodes.** *Animal Science: An International Journal of Fundamental and Applied Research* 67 (1): 39-48, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Keywords: Belmont Adaptaur, Belmont BX, Belmont Red, Boran, Brahman, Charolais, Tuli, breed differences, host, cattle tick, Acarina, pest, nematode, parasite, gastrointestinal nematode infestation, parasitic disease, breed difference, crossbreeding, heterosis, live weight gain, Australia.

Galbraith, H. (2002). **Hormones in international meat production: Biological, sociological and consumer issues.** *Nutrition Research Reviews* 15 (2): 293-314, ISSN: 0954-4224.

NAL Call Number: QP141 A1N87.

Keywords: beef cattle, human, consumer, cancer, neoplastic disease, DNA, carcinogens, hormonal compounds, biological functions/effects, uses, hormones, xenobiotics, consumer issues, food safety, human health risks, international meat production, hormonal aspects, mathematical models, meat product, quality, safety, sociological issues, review, European Union.

Galland, J.C.; House, J.K.; Hyatt, D.R.; Hawkins, L.L.; Anderson, N.V.; Irwin, C.K.; Smith, B.P. (2000). **Prevalence of Salmonella in beef feeder steers as determined by bacterial culture and ELISA serology.** *Veterinary Microbiology* 76(2): 143-51.

NAL Call Number: SF601 V44.

Keywords: monitoring Salmonella infection, bacteriological culture, immune response (enzyme linked immunosorbent assay (ELISA), haptoglobin.

Galland, J.C.; Hyatt, D.R.; Crupper, S.S.; Acheson, D.W. (2001). **Prevalence, antibiotic susceptibility, and diversity of Escherichia coli O157:H7 isolates from a longitudinal study of beef cattle feedlots.** *Applied and Environmental Microbiology* 67(4): 1619-27.

NAL Call Number: 448.3 Ap5.

Keywords: bacteria prevalence, Escherichia coli infections, antibiotic susceptibility, beef cattle feedlots, fecal pat, environmental samples, USA, Kansas.

Galyean, M.L.; Perino, L.J.; Duff, G.C. (1999). **Interaction of cattle health/immunity and nutrition.** *Journal of Animal Science* 77(5): 1120-1134. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: The usual means of assessing the health of newly received beef cattle susceptible to bovine respiratory disease (BRD) are subjective, typically involving visual evaluation aided by minimal clinical measurements. Recent evidence based on the occurrence of pneumonic lung lesions at slaughter indicates a need for more accurate methods of diagnosing BRD. Inadequate passive immune transfer at birth may be an important risk factor in susceptibility to BRD, suggesting the need for management to improve passive transfer success rates. Preweaning management and vaccination practices offer opportunities for beef cattle producers to improve the immune status of newly weaned calves and decrease postweaning BRD. Feeding diets with higher levels of concentrate typically improves performance by newly weaned or received cattle, as does feeding diets supplemented with protein; however, limited data suggest that increasing concentrate and protein in receiving diets increases the rate and severity of subjectively determined BRD morbidity. Research with receiving diet concentrate/protein level relative to humoral and cell-mediated immune function coupled with indicators of health and performance is needed. Supplemental B vitamins are sometimes useful in receiving diets, but the effects have been variable, presumably reflecting differences in stress and associated feed intake responses. Vitamin E added to receiving diets to supply $>(\text{or})= 400$ IU/animal daily seems beneficial for increasing gain and decreasing BRD morbidity; however, further dose titration experiments are needed. Supplemental Zn, Cu, Se, and Cr can alter immune function of newly received calves, and some field trials have shown decreases in BRD morbidity rate with supplementation; however, several experiments have shown no performance or health/immune benefits from supplementation of these trace minerals. Formulation of receiving diets should take into account decreased feed intake by highly stressed, newly received beef cattle and known nutrient deficiencies, but fortification

of such diets with trace minerals beyond the levels needed to compensate for these effects is difficult to justify from present data.

Keywords: immune system, health, nutritional state, interactions, energy intake, dietary protein, nutrient intake, mineral nutrition, evaluation, clinical examination, lesions, respiratory diseases, risk factors, passive immunity, vaccination, weaning, calves, concentrates, performance, protein supplements, morbidity, vitamin supplements, stress, feed intake, vitamin E, vitamin B complex, live weight gain, dosage effects, zinc, copper, selenium, chromium, feed formulation, literature reviews.

Gannon, V.P.J.; Graham, T.A.; King, R.; Michel, P.; Read, S.; Ziebell, K.; Johnson, R.P. (2002). **Escherichia coli O157: H7 infection in cows and calves in a beef cattle herd in Alberta, Canada.** *Epidemiology and Infection* 129 (1): 163-172, ISSN: 0950-2688.

NAL Call Number: RA651 A1E74.

Abstract: *Escherichia coli* O157:H7 infection of cows and calves in a naturally-infected beef cattle herd in Alberta, Canada, was investigated over 2 years, encompassing two calf production cycles. In both years of the study, *E. coli* O157:H7 was isolated from the faeces of cows shortly after but not before parturition in late winter: 6/38 (16%) in 1996 and 13/50 (26%) in 1997. At <1 week post-partum, 13/52 (25%) calves born in 1997 were shedding the organism. Faecal shedding of *E. coli* O157:H7 by cows and calves continued over the 7 weeks that they were in the calving pens, with the organism being isolated from the faeces of 2-18% of cows and 23-26% of calves during this period. Five weeks after they were moved onto a native grass pasture, all the calves and all but one cow in 1997 had ceased shedding the organism. When the calves were weaned in the fall, *E. coli* O157:H7 was isolated from the faeces of 0-1.5% of the calves 1 week prior to weaning and from 6-14% of the calves within 2 weeks after weaning. Parturition, calving pens and weaning appear to be important factors in maintaining *E. coli* O157: H7 infections in this beef cattle herd. Isolates from cows and calves during the immediate post-partum period were mostly of the same pulsed-field gel electrophoresis (PFGE) type of *E. coli* O157:H7. Similarly, at weaning a common PFGE type of *E. coli* O157:H7, which differed slightly from the post-partum PFGE type, was isolated from the calves. These typing data suggest a common source of infection for the animals as well as demonstrate clonal turnover of resident populations of this pathogen.

Keywords: *Escherichia coli*, pathogen, strain-O157:H7, bacterial disease.

Gansheroff, L.J.; O'Brien, A.D. (2000). **Escherichia coli O157:H7 in beef cattle presented for slaughter in the U.S.: Higher prevalence rates than previously estimated.**

Proceedings of the National Academy of Sciences of the United States of America 97(7): 2959-2961, ISSN: 0027-8424.

NAL Call Number: 500 N21P.

Keywords: slaughter, *Escherichia coli*, pathogen, strain, O157:H7, contamination, meat.

Genovez, M.E.; Oliveira, J.C., Castro, V., Gregory, L., Del Fava, C.; Ferrari, C.I.L, Pituco, E.M.; Scarcelli, E.; Cardoso, M.V., Grasso, L.M.P.S; Santos, S.M. (2001). **Reproductive performance of a Nelore beef cattle with endemic leptospirosis [Desempenho reprodutivo de um rebanho Nelore de criacao extensiva com leptospirose endemica: Estudos preliminares.]** *Revista Brasileira de Reproducao Animal* 25 (2): 244-246, ISSN: 0102-0803.

NAL Call Number: QP251 R48.

Keywords: Nelore, breed, bacterial disease, health, endemic leptospirosis, reproductive performance data, calving rate, age differences, conception rates, calving interval, antibody titers, immunity, Brazil, Portuguese language.

Golla, S.C.; Murano, E.A.; Johnson, L.G.; Tipton, N.C.; Cureington, E.A.; Savell, J.W. (2002). **Determination of the occurrence of *Arcobacter butzleri* in beef and dairy cattle from Texas by various isolation methods.** *Journal of Food Protection* 65 (12): 1849-1853, ISSN: 0362-028X.

NAL Call Number: 44.8 J824.

Keywords: *Arcobacter butzleri*, pathogen, cattle, beef, dairy, host, feces, bacterial disease, Collins isolation method, culturing techniques, Johnson-Murano isolation method, polymerase chain reaction, Texas.

Greenough, P.R. (1996). ***A Study of the Economic Importance, Cause and Prevention of Sandcracks and other Acquired Claw Defects in Beef Cattle*** Agriculture Development Fund: Saskatchewan, Canada, 11 p.

NAL Call Number: SF967.L3G73 1996.

Keywords: economics, claw defects, cracks, fissures, horizontal groove, nutrition, laminitis, conformation, frame size.

Griffin, D. (1997). **Economic impact associated with respiratory disease in beef cattle.** *The Veterinary Clinics of North America. Food Animal Practice* 13(3):367-77.

NAL Call Number: SF601 V535.

Keywords: economic loss, production costs, prevention, diagnosis, treatment, review.

Groot, M.J. (2002). **Hepatitis in growth promoter treated cows.** *Journal of Veterinary Medicine Series A* 49 (9): 466-469, ISSN: 0931-184X.

NAL Call Number: 41.8 Z5.

Abstract: Adult female beef cattle found positive for stanozolol in the urine were investigated for liver pathology. In all the animals toxic hepatitis was found, including cholestasis, periportal fibrosis and inflammation, focal necrosis and blood filled lacunae. As no clinical data of the cows were available, apart from the history of illegal stanozolol abuse, it is not possible to attribute all changes to the illegal hormone treatment. Moreover, the cows have probably been treated with a cocktail, and apart from stanozolol more anabolic steroids may have been used. Management factors, viral and bacterial infections, former caesarean sections and especially feeding regime may also be responsible for the lesions described. Striking similarities with data from hepatotoxicity found in human body builders using similar agents, however, suggest a major role of stanozolol as causative agent.

Keywords: adult, beef cattle, cows, female, hepatitis, diagnosis, digestive system disease, drug induced, etiology, pathology, stanozolo, adverse effects, androgenic, steroid, hepatitis, hepatotoxin, illegal growth promoter, toxicity, histopathology.

Hathaway, S.C. (1997). **Intensive (pasture) beef cattle operations: the perspective of New Zealand.** *Revue Scientifique et Technique: Office International des Epizooties* 16 (2): 382-390.

NAL Call Number: SF781 R4.

Keywords: beef, food safety, microbial contamination, public health, beef cattle, intensive husbandry, meat hygiene, zoonoses, disease control, meat production, cattle diseases, *Salmonella*, *Escherichia coli*, *Listeria monocytogenes*, *Toxoplasma gondii*, New Zealand.

Henricks, D.M.; Gray, S.L.; Owenby, J.J.; Lackey, B.R. (2001). **Residues from anabolic preparations after good veterinary practice.** *APMIS* 109(4): 273-83.

NAL Call Number: QR1 A.

Keywords: detection of estrogens in edible tissues of beef cattle, muscle, liver, kidney, fat tissues, E2beta (active isomer), radioimmunoassays, anabolic ear implants,.

Herrick, J.B. (2000). **Pneumonia in beef cattle, or "scratch shipping fever."** *Large Animal Practice* 21(3): 29.

NAL Call Number: SF601 B6.

Keywords: feedlots, pneumonia, etiology, mixed infections, stress, antibiotics, losses.

Higdon, H.L.; Spitzer, J.C.; Johnson, S.N.; Kennedy, S.P.; Burns, G. L; Bridges, W.C. (1999). **Streptozotocin, induced diabetes mellitus in beef cows.** *Journal of Animal Science* 77 (SUPPL. 1): 219, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: diabetes mellitus, endocrine disease, pancreas, metabolic disease, streptozotocin, induced disease model.

Hopkins, S.G.; DiGiacomo, R.F. (1997). **Natural transmission of bovine leukemia virus in dairy and beef cattle.** *The Veterinary Clinics of North America. Food Animal Practice* 13(1):107-28.

NAL Call Number: SF601 V535.

Keywords: disease, bovine leukemia virus (BLV), vertical transmission, in utero, through colostrum and milk, horizontal transmission, contact transmission, review.

Hornitzky, M.A.; Vanselow, B.A.; Walker, K.; Bettelheim, K.A.; Corney, B.; Gill, P.; Bailey, G.; Djordjevic, S.P. (2002). **Virulence properties and serotypes of Shiga toxin-producing Escherichia coli from healthy Australian cattle.** *Applied and Environmental Microbiology* 68 (12): 6439-6445, ISSN: 0099-2240.

NAL Call Number: 448.3 Ap5.

Abstract: The virulence properties and serotypes of complex Shiga toxin-producing Escherichia coli (cSTEC) were determined in two studies of healthy cattle in eastern Australia. In the first, a snapshot study, 84 cSTEC isolates were recovered from 37 of 1,692 (2.2%) fecal samples collected from slaughter-age cattle from 72 commercial properties. The second, a longitudinal study of three feedlots and five pasture beef properties, resulted in the recovery of 118 cSTEC isolates from 104 animals. Of the 70 serotypes identified, 38 had not previously been reported.

Keywords: escherichia coli, bacterial toxins, virulence, serotypes, isolation, cattle dung, drinking water, feedlots, beef cattle, dairy cattle, polymerase chain reaction, genes, free range husbandry, New South Wales, Queensland.

Huber, J.T. (1997). **Probiotics in cattle.** In: *Probiotics 2: Applications and Practical Aspects*, R. Fuller (ed.), Chapman and Hall Ltd: London, United Kingdom, pp. 162-186, ISBN: 0-412-73610-1.

NAL Call Number: QR171.16 P76 1997.

Keywords: beef cattle, calves, lactobacillus, streptococcus, aspergillus, deuteromycotina, bacteria, fungi, lactation, supplements, probiotics, milk production, feed intake, milk yield, animal feeding, animal performance, animal production, behavior.

Hunsaker, B.D.; Perino, L.J. (2001). **Efficacy of intradermal vaccination.** *Veterinary Immunology and Immunopathology* 79(1-2):1-13.

NAL Call Number: SF757.2 V38.

Keywords: alternative vaccination routes, laboratory animals, domestic farm animals, humans, viral, bacterial, parasitic, fungal antigens, clinical protection, body weight change, antibody titers, cytokines, cellular responses, beef cattle, morbidity, mortality, average daily gain, feed efficiency, needs, quality assurance, review.

Huwyler, U.; Reeve, J.L.; Korfitsen, J.; Liesegang, A.; Wanner, M. (1999). **Efficacy evaluation of the use of oral tilmicosin in pneumonic calves.** *Schweizer Archiv fuer Tierheilkunde* 141(4): 203-208, ISSN: 0036-7281.

NAL Call Number: 41.8 SCH9.

Keywords: calves, bacterial disease, respiratory system disease, bronchopneumonia, naturally occurring, treatment, medicated milk, tilmicosin, antibacterial, drug, efficacy, dosages.

Ishizaki, H.; Nishinasuno, T.; Kariya, Y. (1999). **Effects of peripheral blood polymorphonuclear leukocyte function and blood components in Japanese black steers [Bos taurus] administered ACTH in a cold environment.** *Journal of Veterinary Medical Science* 61(5): 487-492, ISSN: 0916-7250.

NAL Call Number: SF604 J342.

Keywords: steers, breed, Japanese black, artificial stress, adrenocorticotropin (ACTH) challenge, leukocyte counts, plasma cortisol levels, peripheral blood polymorphonuclear leukocyte (PMN) function, blood composition, corticotropin, cold, environmental temperature, environmental factors.

Jenkins, C.; Pearce, M.C.; Chart, H.; Cheasty, T.; Willshaw, G.A.; Gunn, G.J.; Dougan, G.; Smith, H.R.; Synge, B.A.; Frankel, G. (2002). **An eight-month study of a population of verocytotoxigenic Escherichia coli (VTEC) in a Scottish cattle herd.** *Journal of Applied Microbiology* 93(6): 944-953, ISSN: 1364-5072.

NAL Call Number: QR1 J687.

Abstract: Strains of Verocytotoxin-producing Escherichia coli (VTEC) from Scottish beef cattle on the same farm were isolated during four visits over a period of eight months. Characteristics of these strains were examined to allow comparisons with strains of VTEC associated with human infection. Methods and Results: Strains were characterized to investigate the relationship between these bovine isolates with respect to serotype, Verocytotoxin (VT) type, intimin-type, and presence or absence of the enterohaemolysin genes. VT genes were detected in 176 of 710 (25%) faecal samples tested using PCR, although only 94 (13%) VTEC strains were isolated using DNA probes on cultures. Forty-five different serotypes were detected. Commonly isolated serotypes included O128ab:H8, O26:H11 and O113:H21. VTEC O26:H11 and O113:H21 have been associated with human disease. Strains harbouring the VT2 genes were most frequently isolated during the first three visits to the farm and those with both VT1 and VT2 genes were the major type during the final visit. Of the 94 strains of non-O157 VTEC isolated, 16 (17%) had the intimin gene, nine had the gene encoding beta-intimin and seven strains had an eta/zeta-intimin gene. Forty-one (44%) of 94 strains carried enterohaemolysin genes. Conclusions: Different serotypes and certain transmissible characteristics, such as VT-type and the enterohaemolysin phenotype, appeared to be common throughout the VTEC population at different times.

Significance and Impact of the Study: Detailed typing and subtyping strains of VTEC as described in this study may improve our understanding of the relationship between bovine VTEC and those found in the human population.

Keywords: Scottish beef cattle herd, *Escherichia coli* (Enterobacteriaceae), pathogen, toxigenic isolates, bacterial toxins, intimin, proteins, toxin genes, toxins, verocytotoxins, biological activities/effects, production, microbiology, bacterial populations, epidemiology, gene functions, human populations, analysis, phenotypes, Scotland.

Johnston, A. M.; Edwards, D. S. (1996). **Welfare implications of identification of cattle by ear tags.** *Veterinary Record* 138 (25): 612-614, ISSN: 0042-4900.

NAL Call Number: SF601 I4.

Keywords: calves, cull cows, animal welfare, metals, plastics, wounds, identification, ear tags, complications, ear diseases.

Kasari, T.R.; Barling, K.; McGrann, J. M. (1999). **Estimated production and economic losses from *Neospora caninum* infection in Texas beef herds.** *Bovine Practitioner* 33 (2): 113-120, ISSN: 0524-1685.

NAL Call Number: SF779.5 A1B6.

Keywords: computer simulation, economic loss model, Standardized Performance Analysis (SPA) records, disease, *Neospora caninum* infection, parasite, pregnancy percentage, calving percentage (live calves born), calf death loss between birth and weaning, weaned calf crop, pounds of calf weaned .

Keen, J.E.; Elder, R.O. (2002). **Isolation of shiga-toxigenic *Escherichia coli* O157 from hide surfaces and the oral cavity of finished beef feedlot cattle.** *Journal of the American Veterinary Medical Association* 220 (6): 756-763, ISSN: 0003-1488.

NAL Call Number: 41.8 Am3

Abstract: To determine whether viable shiga-toxigenic *Escherichia coli* (STEC) O157 could be isolated from hide surface locations and the oral cavity of finished beef feedlot cattle.

Design: Within-animal prevalence distribution survey. Animals: 139 finished cattle in 4 pens in a feedlot in Nebraska, prevalence of fecal STEC O157 shedding ranged from 20 to >90%.

Procedure: Samples were collected from 7 sites from each animal: feces, oral cavity, and 5 hide surface locations (lumbar region, ventral aspect of the neck, ventral abdominal midline (ventrum), dorsal thoracic midline (back), and distal aspect of the left hind limb (hock)).

Results: Viable STEC O157 were isolated from the oral cavity or 1 or more hide surfaces of 130 cattle, including 50 fecal isolation-negative cattle. Site-specific prevalence of STEC O157 was 74.8% for oral cavity samples, 73.4% for back samples, 62.6% for neck samples, 60.4% for fecal samples, 54.0% for flank samples, 51.1% for ventrum samples, and 41.0% for hock samples. Only 5 cattle tested negative for STEC O157 at all 7 sites. Multiple correspondence and cluster analyses demonstrated that bacterial culture of feces, oral cavity samples, and back samples detected most cattle with STEC O157. Conclusions and Clinical Relevance: Results suggest that viable STEC O157 may be isolated from the oral cavity, multiple hide surfaces, and feces of a high percentage of fed beef cattle and that bacterial culture of feces alone generally underestimates the percentage of fed beef cattle from which STEC O157 can be isolated.

Keywords: *Escherichia coli*, pathogen, strain-shiga-toxigenic O157, oral cavity, food safety, public veterinary medicine. Copyright© 2003, CAB International

King, C.; Rogers, G. (1996). **The evaluation of injection site reactions in beef cattle, comparing three multivalent clostridial vaccines.** *Bovine Practitioner* 30: 88, ISSN: 0524-1685.

NAL Call Number: SF779.5 A1B6.

Keywords: castrated male, female, herd health program, injection site reaction, injury, meeting abstract, meeting poster, therapeutic method, vaccination.

Kottferova, J.; Korenekova, B. (1997). **Comparison of the occurrence of risk elements in bulls and dairy cows coming from the fallout region of a metallurgical plant on the territory of Slovakia.** *Archiv fuer Tierzucht* 40 (4): 309-316, ISSN: 0003-9438.

NAL Call Number: 49 AR23.

Keywords: bulls, dairy cows, pollution, risk elements, toxicology, lead, copper, cadmium, zinc, nickel, organs, liver, kidneys, muscle, heart, Europe, Slovakia.

Larson, B.L. (1996). **Calculating supplementation requirements to address trace mineral deficiency.** *Agri Practice* 17 (2): 6-10, ISSN: 0745-452X.

NAL Call Number: SF601.B6

Keywords: trace mineral deficiency, diagnosis, methods, nutrition, treatment, liver, serum, feedstuff samples.

Lasta, J.A.; Rearte, D. (1997). **Sanitary conditions for the production of beef cattle in Argentina. [Condiciones sanitarias de la produccion de carne bovina en Argentina.]** *Revue Scientifique et Technique* 16 (2):369-81, ISSN: 0253-1933.

NAL Call Number: SF781.R4.

Keywords: meat production, economy, natural resources, traditional extensive grazing, breed and age, diet of the animals, disease incidence, bovine spongiform encephalopathy (BSE), brucellosis, tuberculosis, salmonellosis, campylobacteriosis, colibacillosis, taeniosis, chemical contaminants in meat, Spanish language, Argentina.

Lechtenberg, K.F.; Smith, R.A.; Stokka, G.L. (1998). **Feedlot medicine and management.** *Veterinary Clinics of North America: Food Animal Practice* 14(2): 177-197.

NAL Call Number: SF601 V535 v.14 no.2.

Keywords: feedlots, nutrition, health, feedlot diseases, feedlot therapeutics, handling, stress.

Lee, R.W.H.; Strommer, J.; Hodgins, D.; Shewen, P.E.; Niu, Y.; Lo, R.Y.C. (2001). **Towards development of an edible vaccine against bovine pneumonic pasteurellosis using transgenic white clover expressing a Mannheimia haemolytica A1 leukotoxin 50 fusion protein.** *Infection and Immunity* 69(9): 5786-5793.

NAL Call Number: QR1 I57.

Abstract: Development of vaccines against bovine pneumonia steurellosis, or shipping fever, has focused mainly on Mannheimia haemolytica A1 leukotoxin (Lkt). In this study, the feasibility of expressing Lkt in a forage plant for use as an edible vaccine was investigated. Derivatives of the M. haemolytica Lkt in which the hydrophobic transmembrane domains were removed were made. Lkt66 retained its immunogenicity and was capable of eliciting an antibody response in rabbits that recognized and neutralized authentic Lkt. Genes encoding a shorter Lkt derivative, Lkt50, fused to a modified green fluorescent protein (mGFP5), were constructed for plant transformation. Constructs were screened by Western immunoblot analysis for their ability to express the fusion protein after agroinfiltration in tobacco. The fusion construct pBlkt50-mgfp5, which employs the cauliflower mosaic virus 35S promoter for transcription, was selected and introduced into white clover by Agrobacterium

tumefaciens-mediated transformation. Transgenic lines of white clover were recovered, and expression of Lkt50-GFP was monitored and confirmed by laser confocal microscopy and Western immunoblot analysis. Lkt50-GFP was found to be stable in clover tissue after drying of the plant material at room temperature for 4 days. An extract containing Lkt50-GFP from white clover was able to induce an immune response in rabbits (via injection), and rabbit antisera recognized and neutralized authentic Lkt. This is the first demonstration of the expression of an *M. haemolytica* antigen in plants and paves the way for the development of transgenic plants expressing *M. haemolytica* antigens as an edible vaccine.

Keywords: bacterial toxins, gene transfer, gene expression, *trifolium repens*, recombinant vaccines.

Lents, C.A.; Wettemann, R.P.; Paape, M.J.; Vizcarra, J.A.; Looper, M.L.; Buchanan, D.S.; Lusby, K.S. (2002). **Efficacy of intramuscular treatment of beef cows with oxytetracycline to reduce mastitis and to increase calf growth.** *Journal of Animal Science* 80 (6):1405-1412, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: bacteria, mastitis causing species, oxytetracycline, antibacterial drug, intramuscular treatment, calf growth, somatic cell count, weaning weight.

Lents, C.A.; Wettemann, R.P.; Vizcarra, J.A.; Looper, M.L.; Paape, M.J. (1997). **Dry cow treatment of beef cows: Effects on mammary health and calf growth.** *Journal of Animal Science* 75 (SUPPL. 1): 249, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Hereford, Hereford x Angus, breed, host, *Staphylococcus aureus* (Micrococcaceae), pathogen, disease, mastitis, antibacterial drugs, novobiocin sodium, penicillin G procaine.

Lowe, L.B. (1998). **Prevention of bloat in pastured cattle: Using monensin sodium controlled release capsules (CRC).** *Bovine Practitioner* 0 (32 PART 1): 27-30, ISSN: 0524-1685.

NAL Call Number: SF779.5 A1B6.

Keywords: bloat, grazing, legume pastures, prevention, monensin sodium, controlled release capsule formulation, oral administration, live weight gain, milk yield, mortality, pasture housing, protein yield.

Loyacano, A.F.; Williams, J.C.; Gurie, J.; DeRosa, A.A. (2002). **Effect of gastrointestinal nematode and liver fluke infections on weight gain and reproductive performance of beef heifers.** *Veterinary Parasitology* 107 (3): 227-234, ISSN: 0304-4017.

NAL Call Number: SF810 V4.

Keywords: *Fasciola hepatica* (bovine liver fluke), parasites, *Ostertagia ostertagi*, beef cattle, calf, crossbred, heifer, host, feces, clorsulon, antiinfective drug, dosage, drench administration, doramectin, subcutaneous administration, ivermectin, subcutaneous administration, palpation, prenatal diagnostic method, body weight, pregnancy, reproductive performance, weight gain.

Marley, S.E.; Corwin, R.M.; Hutcheson, D.P. (1996). **Effect of *Fasciola hepatica* on productivity of beef steers from pasture through feedlot.** *Agri-Practice* 17 (1): 18-23, ISSN: 0745-452X.

NAL Call Number: SF601 B6

Keywords: steers, crossbred, fluke infected steers, antihelminthic-drug, antiparasitic-drug, herd health program, ivermectin-clorsulon, performance, pharmaceuticals.

McAllister, M.M.; Gould, D.H.; Raisbeck, M.F.; Cummings, B.A.; Loneragan, G.H. (1997). **Evaluation of ruminal sulfide concentrations and seasonal outbreaks of polioencephalomalacia in beef cattle in a feedlot.** *Journal of the American Veterinary Medical Association* 211 (10): 1275-1279, ISSN: 0003-1488.

NAL Call Number: 41.8 Am3

Keywords: steers, polioencephalomalacia, nervous system disease, nutritional disease, epidemiologic analysis, sulfide, ruminal fluid, thiamine, blood, feedlot, season.

Meerschman, F. de; Speybroeck, N.; Berkvens, D.; Rettigner, C.; Focant, C.; Leclipteux, T.; Cassart, D.; Losson, B. (2002). **Fetal infection with *Neospora caninum* in dairy and beef cattle in Belgium.** *Theriogenology* 58 (5): 933-945, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5.

Keywords: beef cattle, dairy cattle, abortion, *Neospora caninum*, protozoan parasite, brain, diagnosis, fetus, fetal, neonatal mortality, histopathology, immunohistochemistry, Belgium.

Melo, C.B.; Lobato, Z.I.P.; Camargos, M.F.; Souza, G.N.; Martins, N.R.S.; Leite, R.C. (2002). **Distribution of antibodies to bovine herpesvirus 1 in cattle herds. [Distribuição de anticorpos para herpesvirus bovino 1 em rebanhos bovinos.]** *Arquivo Brasileiro de Medicina Veterinária e Zootecnia* 54 (6): 575-580, ISSN: 0102-0935.

NAL Call Number: SF604.A76

Keywords: bovine herpesvirus, frequency rates, neutralizing antibodies, age differences, husbandry, beef cattle, beef herds, dairy cattle, dairy herds, Portuguese language, Brazil.

Moyo, D.Z.; Bwangamoi, O.; Hendrikx, W.M.; Eysker, M. (1996). **The epidemiology of gastrointestinal nematode infections in communal cattle and commercial beef cattle on the highveld of Zimbabwe.** *Veterinary Parasitology* 67(1-2):105-20.

NAL Call Number: SF810.V4

Keywords: epidemiological study, gastrointestinal nematode infections, irrigated pastures, fecal egg counts, seasonal variation, worm burdens at time of necropsy, *Cooperia pectinata*, *C. punctata*, *Haemonchus placei*, *Trichostrongylus axei*, *Oesophagostomum radiatum*.

Nagaraja, T.G.; Chengappa, M.M. (1998). **Liver abscesses in feedlot cattle: a review.** *Journal of Animal Science* 76(1): 287-98. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: health, slaughter, grain feeding, diet, management factors, economic loss, reduced feed intake, reduced weight gain, decreased feed efficiency, decreased carcass yield, *Fusobacterium necrophorum*, ruminal anaerobic bacterial flora, *Actinomyces pyogenes*, etiologic agent, treatment, antimicrobial compounds, bacitracin methylene disalicylate, chlortetracycline, oxytetracycline, tylosin, virginiamycin.

Nagels, J.W.; Davies-Colley, R.J.; Donnison, A.M.; Muirhead, R.W. (2002). **Faecal contamination over flood events in a pastoral agricultural stream in New Zealand.** *Water Science and Technology* 45 (12): 45-52, ISSN: 0273-1223.

NAL Call Number: TD420 A1P7

Abstract: Faecal bacterial dynamics during flood events were studied in the Topehaehae Stream near Morrinsville, New Zealand, in a catchment used for grazing dairy and beef cattle. During the rising limb of a natural flood event, *E. coli* bacterial concentration rose by more than 2 orders of magnitude and peaked at 41,000 cfu/100 mL. *E. coli* correlated closely with turbidity over the flood event, and both variables peaked close to the time of maximum flow acceleration rather than peak flow. An artificial flood on the same stream, created by releasing water from a supply reservoir during fine weather with no wash-in from the catchment, produced a broadly similar pattern of faecal contamination (peak *E. coli*=12,500 cfu/100 mL). This and other evidence suggests that direct deposition of faecal matter by cattle in the stream channel may be of similar or greater importance than wash-in from land. The flood experiments have been useful for constructing a model of faecal bacterial yields, and they imply that exclusion of livestock from stream channels may appreciably improve water quality.

Keywords: pollution control, *Escherichia coli*, bioindicator, stream concentration, environmental management, artificial flood, direct faecal matter deposition, flood events, maximum flow acceleration, peak flow, stream channels, livestock exclusion, supply reservoir water release, turbidity, water quality.

National Animal Health Monitoring System (U.S.) (1998). *Changes in the U.S. beef cow-calf industry, 1993-1997 Part IV / National Animal Health Monitoring System* U.S. Dept. of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services: Fort Collins, CO, 48 p.

NAL Call Number: aSF207 C43 1998.

Keywords: husbandry, genetics, production, United States.

Nikolic, J.A.; Samanc, H.; Begovic, J.; Krsmanovic, J.; Aleksic, S.; Miscevic, B.; Huszenicza, G.; Damjanovic, Z. (1998). **Basal serum cortisol concentrations in cattle.** *Acta Veterinaria (Beograd)* 48 (5/6): 265-276, ISSN: 0567-8315.

Keywords: calves, cows, bulls, age differences, hydrocortisone, blood serum, blood chemistry, radioimmunoassay stress, normal values.

Nocek, J.E. (1997). **Bovine acidosis: implications on laminitis.** *Journal of Dairy Science* 80(5): 1005-1028.

NAL Call Number: 44.8 J822.

Abstract: Bovine lactic acidosis syndrome is associated with large increases of lactic acid in the rumen, which result from diets that are high in ruminally available carbohydrates, or forage that is low in effective fiber, or both. The syndrome involves two separate anatomical areas, the gastrointestinal tract and body fluids, and is related to the rate and extent of lactic acid production, utilization, and absorption. Clinical manifestations range from loss of appetite to death. Lactic acid accumulates in the rumen when the bacteria that synthesize lactic acid outnumber those that utilize lactic acid. The systemic impact of acidosis may have several physiological implications, including laminitis, a diffuse aseptic inflammation of the laminae (corium). Although a nutritional basis for the disease exists, etiology includes a multitude of interactive factors, such as metabolic and digestive disorders, postpartum stress, and localized trauma, which lead to the release of vasoactive substances that trigger mechanisms that cause degenerative changes in the foot. The severity of laminitis is related to the frequency, intensity, and duration of systemic acidotic insults on the mechanisms responsible for the release of vasoactive substance. The critical link between acidosis and

laminitis appears to be associated with a persistent hypoperfusion, which results in ischemia in the digit. Management of acidosis is critical in preventing laminitis. High producing dairy herds attempting to maximize energy intake are continually confronted with subclinical acidosis and laminitis. Management of feeding and husbandry practices can be implemented to reduce incidence of disease.

Keywords: dairy cows, laminitis, lactic acidosis, etiology, ischemia, rumen motility, ph, rumen microorganisms, rumen mucosa, feed intake, beef cattle, diagnosis, risk factors, lesions, hemodynamics, soles, digits, incidence, feed formulation, age differences, dietary carbohydrate, literature reviews.

Oliveira, G.P. de; Freitas, A.R. de (1997). **Behaviour of Haematobia irritans on farms with different cattle management.** [Comportamento da Haematobia irritans em fazendas com diferentes manejos de bovinos.] *Ciencia Rural* 27 (2): 279-284, ISSN: 0103-8478.

NAL Call Number: S192.R4

Keywords: crossbred beef cattle, horn flies, chemical control, insecticides, acaricides, farms, population ecology, seasonal abundance, ectoparasites, trichlorfon, fenthion, organophosphorus insecticides, levamisole, anthelmintics, pyrethroids, amitraz, formamidine acaricides, pyrethroid acaricides, nontarget effects, Portuguese language, Brazil.

Ondrasovic, M.; Ondrasovicova, O.; Para, L.; Vargova, M.; Krajnak, M. (1998). **Hygienic problems in cattle husbandry from the point of view of welfare.** [Hygienicka problematika chovu hovadzieho dobytku z pohladu welfare.] In: *Animal Protection and Welfare 98. Proceedings of the Conference Held on the Occasion of the 80th Foundation Anniversary of the Veterinary and Pharmaceutical University in Brno (Czech Republic)* Veterinarni a Farmaceuticka Univ.: Brno, Czech Republic, pp. 110-113, ISBN: 80-85114-42-9.

Keywords: hygiene, animal welfare, behavior, health, animal performance.

Panicke, L.; Matthes, H.D. (1996). **Postnatal development of cows calves and bulls calves.** [Postnatale Entwicklung weiblicher and mannlicher Jungrinder.] *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 291: 91-99, ISSN: 1232-3071.

Keywords: calves, heifers, bulls, perinatal period, growth period, growth rate, weight, animal developmental stages, biological development, Poland, German language.

Panter, K.E., Mayland, H.F.; Gardner, D.R.; Shewmaker, G. (2001). **Beef cattle losses after grazing *Lupinus argenteus* (silvery lupine).** *Veterinary and Human Toxicology* 43 (5): 279-282, ISSN: 0145-6296.

NAL Call Number: SF601 A47.

Keywords: yearling steers, plant poisoning, death from eating seed pod stage *Lupinus argenteus* (silvery lupine), high levels of piperidine alkaloids, ammodendrine-methylammodendrine, reduced availability of quality feed.

Paputungan, U.; Makarechian, M. (2000). **The influence of dam weight, body condition and udder scores on calf birth weight and preweaning growth rates in beef cattle.** *Asian, Australasian Journal of Animal Sciences* 13 (4): 435-439, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: beef cows, weight, age, body condition at calving, udder scores, calf production, parturition, preweaning growth rate, weaning weights.

Petersen, J.J.; Currey, D.M. (1996). **Timing of releases of gregarious *Muscidifurax raptorellus* (Hymenoptera: Pteromalidae) to control flies associated with confined beef cattle.** *Journal of Agricultural Entomology* 13 (1): 55-63, ISSN: 0735-939X.

NAL Call Number: SB599 J69

Keywords: pests, house fly (*Musca domestica*), biological control, *Muscidifurax raptorellus*, cattle housing, release techniques, biological control agents, evaluation.

Plasse, D.; Fossi, H.; Hoogesteijn, R. (1998). **Mortality in Venezuelan beef cattle.** *World Animal Review (Multilingual Edition)* 90 (1): 28-38, ISSN: 1014-6954.

NAL Call Number: SF191 W62

Keywords: breed, Criollo, Elite Brahman, Elite Guzerat, Elite Nellore, Guzerat, Registered Nellore, Bos, taurus x Bos, indicus, mortality, postweaning loss, preweaning loss, Venezuela, South America.

Polack, B.; Schwartz, I.; Berthelemy, M.; Belloc, C.; Manet, G.; Vuillaume, A.; Baron, T.; Gonda, M.A.; Levy, D. (1996). **Serologic evidence for bovine immunodeficiency virus infection in France.** *Veterinary Microbiology* 48 (1-2): 165-173, ISSN: 0378-1135.

NAL Call Number: SF601 V44

Keywords: serologic detection, bovine immunodeficiency virus (BIV), seroprevalence, virulence, France.

Purdy, C.W.; Loan, R.W.; Straus, D.C.; Briggs, R.E.; Frank, G.H. (2000). **Conglutinin and immunoconglutinin titers in stressed calves in a feedlot.** *American Journal of Veterinary Research* 61(11): 1403- 1409, ISSN: 0002-9645.

NAL Call Number: 41.8 Am3A.

Keywords: beef breed, calves, stress, feedlots, respiratory tract disease, conglutinin titers, housing, pens.

Quintanilla-Gozalo A.; Pereira-Bueno, J.; Tabares, E.; Innes, E.A.; Gonzalez-Paniello, R.; Ortega-Mora, L.M. (1999). **Seroprevalence of *Neospora caninum* infection in dairy and beef cattle in Spain.** *International Journal for Parasitology* 29(8):1201-8.

NAL Call Number: QH547 I55.

Keywords: neosporosis, abortion in cattle, beef and dairy cattle production, random herd samples, antibody detection, herd size, Spain.

Ramirez, V.R.; Misztal, I.; Bertrand, J.K. (1999). **Comparison of threshold and linear models for calving difficulty in beef cattle.** *Journal of Animal Science* 77(SUPPL. 1): 144, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breeding value, linear model, mathematical model, reproductive performance, calving difficulty, threshold model, mathematical model.

Reid, C.A.; Avery, S.M.; Warriss, P.; Buncic, S. (2002). **The effect of feed withdrawal on *Escherichia coli* shedding in beef cattle.** *Food Control* 13 (6-7): 393-398, ISSN: 0956-7135.

NAL Call Number: TP372.7 F66

Abstract: Ten beef cattle feeding on silage were orally administered a marker organism (nalidixic acid resistant *Escherichia coli* K12) daily over six days. Subsequently, the

administration of the marker organism was stopped, and the animals were divided into two groups (five animals each). The feed was removed from one group (i.e. fasted group) for 48 h, while the feeding of the control group was continued during that period, until both groups were subsequently slaughtered. During this pre-slaughter period, faecal shedding of total *E. coli* and *E. coli* K12, as well as of background flora (total aerobes, total anaerobes, and lactobacilli), was monitored in faecal material obtained by rectal swabs from each animal. After both 24 and 48 h of fasting, the levels of total *E. coli* shed significantly increased ($P < 0.01$) in the fasted group compared with the control group, total anaerobes shed also increased (after 48 h fasting, $P < 0.05$), while shedding of total aerobes and total lactobacilli did not change significantly. After slaughter of animals, the pH values and the levels of bacterial groups mentioned above were examined in contents of different sections of the gastrointestinal (GI) tract (rumen, abomasum, caecum, small intestine, colon). The pH values were significantly increased in rumen and decreased in abomasum ($P < 0.05$) of the fasted animals compared with controls, but did not differ significantly in other GI sections. Significant decreases of total *E. coli* population ($P < 0.05$) in abomasums and lactobacilli ($P < 0.01$) in small intestines were observed in fasted animals, while other bacterial groups in other GI sections did not change significantly compared with controls. The marker organism *E. coli* K12 was not sufficiently competitive within the bovine GI tracts as it was pre-slaughter shed by, and post-slaughter isolated from, only a minority of animals regardless of the group. Overall, the results indicate that key fasting-induced changes of enteric *E. coli* populations, and influencing its faecal shedding, could have occurred within the relatively short caudal colon-rectum region of the bovine GI tract.

Keywords: *Escherichia coli*, shedding, strain-K12, aerobe, anaerobe, lactobacilli, feed withdrawal. Copyright© 2003, CAB International

Rivera, J.D.; Duff, G.C.; Galyean, M.L.; Stalker, L.A.; Reed, M.M.; Mitchell, B.R. (2002). **Effects of vitamin E supplementation on feed intake and febrile responses of beef cattle challenged with infectious bovine respiratory virus.** *Journal of Dairy Science* 85 (Supplement 1): 48, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: crossbred, host, infectious bovine respiratory virus, pathogen, fever, vitamin E, dietary supplement, average daily gain, dry matter intake, feed intake, rectal temperature, New Mexico, USA.

Rivera, J.D.; Duff, G.C.; Galyean, M.L.; Walker, D.A.; Nunnery, G.A. (2002). **Effects of supplemental vitamin E on performance, health, and humoral immune response of beef cattle.** *Journal of Animal Science* 80 (4): 933-941, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: immunoglobulin G, serum titers, health, humoral immune response, performance, vitamin E, food supplement, supplemental effects.

Roeber, D.L.; Cannell, R.C.; Wailes, W.R.; Belk, K.E.; Scanga, J.A.; Sofos, J.N.; Cowman, G.L.; Smith, G.C.; et al (2002). **Frequencies of injection-site lesions in muscles from rounds of dairy and beef cow carcasses.** *Journal of Dairy Science* 85 (3): 532-6, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: injection site lesions, muscle lesions, beef rounds, dairy rounds, educational programs, veterinary procedures, quality control.

Rogers, G.M.; King, C.M. (1996). **The comparison of injection site reactions caused by two commercial multivalent clostridial vaccines.** *Agri-Practice* 17 (2): 28-33, ISSN: 0745-452X.

NAL Call Number: SF601 B6

Keywords: disease prevention methods, efficacy, subcutaneous injection, injection site reactions, usage, injection procedure, body weight, vaccine injection.

Rossi, C.A. S.; Dell'Orto, V.; Baldi, A.; Morini, M. (1997). **Weight, breed, and type of disease affecting the recovery of unwell beef cattle after transportation.[Peso, razza e tipo di patologia influenzano il recupero sanitario dei bovini da carne problema.]** *Atti della Societa Italiana di Buiatria* 29: 191-198.

Keywords: stress, body weight, breeds, transport of animals, cattle diseases, Italian language.

Rumsey, T.S.; Kahl, S.; Elsasser, T.H. (1999). **Field method for monitoring blood glucose in beef cattle.** *Journal of Animal Science* 77 (8): 2194-2200, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: glucose, blood levels, blood sugar monitoring, field method, monitoring method, Accu, Chek Easy (ACE), human self, monitoring system, use for cattle.

Ruoho, O. (1996). **Elimination of Salmonella infection in a beef herd in a loose housing system. [Salmonellasaneeraus lihanautojen kylmakasvattamossa.]** *Suomen Elainlaakarilehti* 102 (12): 713-718, ISSN: 0039-5501.

Keywords: beef cattle housing, cattle diseases , bacterial diseases, disease control, disease transmission, disinfection, zoonoses, Salmonella, Finnish language, Finland

Russell, J.B.; Mantovani, H.C. (2002). **The bacteriocins of ruminal bacteria and their potential as an alternative to antibiotics.** *Journal of Molecular Microbiology and Biotechnology* 4 (4):347-355, ISSN: 1464-1801.

NAL Call Number: QR74 J68

Abstract: Beef cattle have been fed ionophores and other antibiotics for more than 20 years to decrease ruminal fermentation losses (e.g methane and ammonia) and increase feed efficiency, and these improvements have been explained by an inhibition of Gram-positive ruminal bacteria. Ionophores are not used to treat human disease, but there has been an increased perception that antibiotics should not be used as feed additives. Some bacteria produce small peptides (bacteriocins) that inhibit Gram-positive bacteria. In vitro experiments indicated that the bacteriocin, nisin, and the ionophore, monensin, had similar effects on ruminal fermentation. However, preliminary results indicated that mixed ruminal bacteria degraded nisin, and the ruminal bacterium, *Streptococcus bovis*, became highly nisin-resistant. A variety of ruminal bacteria produce bacteriocins, and bacteriocin production has, in some cases, been correlated with changes in ruminal ecology. Some ruminal bacteriocins are as potent as nisin in vitro, and resistance can be circumvented. Based on these results, ruminal bacteriocins may provide an alternative to antibiotics in cattle rations.

Keywords: *Streptococcus bovis*, pathogen, bacteria, bacteriocins, antibacterial, nisin, review.
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Sanderson, M.W.; Dargatz, D.A. (2000). **Risk factors for high herd level calf morbidity risk from birth to weaning in beef herds in the USA.** *Preventive Veterinary Medicine* 44(1/2): 97-106.

NAL Call Number: SF601 P7.

Keywords: beef herds, calves, beef cattle, morbidity, risk factors, risk assessment, dystocia, animal housing, geographical variation, calving season, weaning, calving.

Sanderson, M.W.; Dargatz, D.A.; Garry, F.B. (2000). **Biosecurity practices of beef cow, calf producers.** *Journal of the American Veterinary Medical Association* 217(2): 185-189, ISSN: 0003-1488.

NAL Call Number: 41.8 Am3

Keywords: cross sectional survey of producers, personal interviews, management practices, data collected, vaccine use, brucellosis testing of imported cattle, Mycobacterium paratuberculosis, bovine viral diarrhea, tuberculosis, feed contamination, quarantine procedures, veterinarians role in biosecurity education.

Sanderson, M.W.; Gay, J.M.; Baszler, T.V. (2000). **Neospora caninum seroprevalence and associated risk factors in beef cattle in the northwestern United States.** *Veterinary Parasitology* 90 (1/2): 15-24, ISSN: 0304-4017.

NAL Call Number: SF810 V4.

Keywords: Neospora caninum, protozoa, epidemiology, serological surveys, seroprevalence, risk factors, cows, calves, questionnaires, pregnancy, animal husbandry, grazing, feeding, age, ELISA, stocking density, winter, Idaho, Montana, Oregon, Washington, Wyoming.

Sargison, N.D.; Hutner, J.E.B.; West, D.M.; Gwozdz, M.J. (1996). **Observations on the efficacy of mass treatment by subconjunctival penicillin injection for the control of an outbreak of infectious bovine keratoconjunctivitis.** *New Zealand Veterinary Journal* 44 (4): 142-144, ISSN: 0048-0169.

NAL Call Number: 41.8 N483

Keywords: calves, efficacy, treatment, injection, drug therapy, lesions, cornea, eye diseases, keratoconjunctivitis, penicillins, bacterial diseases, New Zealand.

Sasaki, H.; Ichikawa, H.; Iwaki, K.; Tsubaki, Y.; et al. (1998). **Fenpropathrin pour, on investigation for efficacy in tick control on grazing cattle.** *Journal of Rakuno Gakuen University Natural Science* 22 (2): 221-224.

NAL Call Number: 44.9 R13

Keywords: cows, Fenpropathrin, acaricide, tick control, treatment, pour on medication.

Schettino R, Daniel; Di Santo C, Monica; Gogorza A, Lidia; Arroyo M,Guillermo; Torres T, Juan; Moran, P.(1996). **Infectious bovine rhinotracheitis epidemiological behavior in beef cattle and a dairy cattle. Tandil, Buenos Aires, Argentina [Comportamiento epidemiológico de la rinotraqueitis infecciosa bovina en un rodeo de cria y otro de tambo. Tandil, Buenos Aires, Argentina.]** *Avances en Ciencias Veterinarias* 11(1): 30-36, ISSN: 0716-260X.

NAL Call Number: SF643 A92

Keywords: rhinotracheitis, bovine herpesvirus, epidemiology, organic diseases, respiratory diseases, Argentina, Spanish language.

Schwartzkopf-Genswein, K.S.; Stookey, J.M.; Crowe, T.G.; Genswein, B.M.A. (1998).

Comparison of image analysis, exertion force, and behavior measurements for use in the

assessment of beef cattle responses to hot-iron and freeze branding. *Journal of Animal Science* 76(4): 972-979. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Thirty-three steers (328 +/- 2 kg) from a total of 300 animals were randomly selected for a comparison of techniques designed to quantify the behavioral response to painful procedures. The steers were randomly assigned to freeze-branding, (F), hot-iron branding (H), and sham branding (S) treatments. The responses of all steers were videotaped to quantify the amount and intensity of head movements during branding. In addition, the force that steers exerted on the headgate and squeeze chute during branding was recorded using strain gauges and load cells. Behaviors believed to be indicative of pain (tail-flicking, kicking, falling, and vocalizing) were also recorded during branding. These techniques were compared for their effectiveness in measuring behavioral responses of steers during branding. Hot-iron-branded steers had greater maximum and average head movement distances and velocities than F or S steers ($P < .05$), and F steers only had greater maximum values than S animals ($P < .05$). The maximum exertion forces obtained from headgate load cells were also greater in H than in F or S steers ($P < .05$); however, no differences were observed between H and F treatments for squeeze load cell or headgate strain gauge data. Hot-iron-branded steers had the greatest incidence of tail-flicks, kicks, falls in the chute, and vocalizations, and S steers had the least. Results indicate that H steers experienced more discomfort at the time of branding than F and S steers, whereas F steers experienced more discomfort than shams. Image analysis was a superior technique for detecting treatment differences compared with exertion force measurements and frequency counts of tail-flicks, kicks, falls, and vocalization during branding.

Keywords: steers, branding, pain, responses, image processing, video recordings, forces, strain gauges, transducers, animal behavior, animal welfare.

Schwartzkopf-Genswein, K.S.; Stookey, J.M.; De Passille, A.M.; Rushen, J. (1997).

Comparison of hot-iron and freeze branding on cortisol levels and pain sensitivity in beef cattle. *Canadian Journal of Animal Science* 77(3): 369-374. ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Abstract: Thirty yearling (450-500 kg) heifers of mixed breeds (Hereford, Charolais, Angus and Shorthorn) were habituated to handling over a 14 +/- 2 d period before branding and were fitted non-surgically with jugular catheters 1 d before branding. On the day of branding, heifers were assigned to hot-iron brand (H), freeze brand (F), or control (C) treatments according to a predetermined randomized branding order ($n = 10$ per treatment). Blood samples were obtained at 20 and 0 min before and 20, 40, 60, 80, 100, 120, 140, 160 and 180 min after application of branding treatments. To detect stress-induced analgesia, each animal's sensitivity to pain was assessed by measuring the time it took them to respond to a thermal energy source (laser) applied to their hind legs. Foot-lift latencies were obtained 0, 10, 20, 60 and 120 min after the treatments were imposed. Sensitivity to touch also was assessed 1 and 7 d after branding by placing pressure on the brand site and measuring the amount of movement by the animals. Both H and F heifers had higher mean plasma cortisol concentrations than C animals 20 and 40 min after branding ($P < 0.05$). However, hot branding was found to cause a more pronounced cortisol response than freeze branding at 40 min ($P < 0.05$). No treatment differences in foot-lift latencies or sensitivity to touch were observed. Both branding methods cause discomfort in cattle; however, hot branding appears to cause a greater acute response than freeze branding.

Keywords: beef cattle, heifers, branding, hydrocortisone, pain, legs, pressure, movement, susceptibility, chemical composition, heat tolerance.

Schwartzkopf-Genswein, K.S.; Stookey, J.M. (1997). **The use of infrared thermography to assess inflammation associated with hot-iron and freeze branding in cattle.** *Canadian Journal of Animal Science* 77(4): 577-583. ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Abstract: Infrared thermography was used to compare differences in extent and duration of inflammation observed on hot-iron and freeze brand sites as an indicator of tissue damage and the associated discomfort to the animals. Thirty beef heifers of mixed breed were assigned to either hot-iron (H) or freeze (F) branding treatments according to a predetermined randomized branding order. Ten animals were branded each day over a 3-d period. On the day prior to branding, animals were clipped to expose two patches of skin; one to be used for the branding treatment and the other for a control. Thermographic images of control and treatment sites were made at 0.08 h (5 min) prior to branding, immediately after the brand was completed (0 h), as well as 0.08, 2, 4, 8, 12, 24, 48, 72, 96, 120, 144 and 168 h after branding. Control site temperatures were subtracted from treatment site temperatures for each individual animal. Both F and H brand sites were consistently warmer (1.9 ± 0.3 and 1.6 ± 0.3 degrees C, respectively) than corresponding control sites between 2 and 168 h after branding. Treatment differences were obtained at 0, 0.08, 2, 8, and 144 h after branding ($P < 0.001, 0.05, 0.005, 0.001$, and 0.01 , respectively). Freeze brand sites were warmer at 2 and 8 h after branding while H sites were warmer at 144 h after branding. The thermographic evaluation of hot-iron and freeze brand sites indicated that both methods caused tissue damage. However, H brand sites remained significantly warmer than F sites at 168 h after branding. In addition, H sites were significantly warmer than control sites while F sites were not warmer than control sites at 168 h. The prolonged inflammatory response observed in H animals indicates that more tissue damage and perhaps more discomfort are associated with H branding.

Keywords: heifers, beef cattle, branding, pain, thermography, skin temperature, heat, inflammation, evaluation, animal welfare, animal tissues, damage, Saskatchewan.

Scott, P. R. (1997). **Epidemiology and treatment of bovine respiratory disease in beef cattle.** *Cattle Practice* 5(4): 283-288, ISSN: 0969-1251.

NAL Call Number: SF961 C37.

Keywords: field study of beef farms, respiratory diseases, antibiotics, drug therapy, marbofloxacin, parainfluenza 3 virus, bovine respiratory syncytial virus, Scotland.

Sgoifo Rossi, C.A., Dell'Orto, V.; Ripamonti, G.; Galmozzi, G. (1998). **Sex - breed and weight affect the receiving period of newly arrived beef cattle (Lombardy). [Sesso - razza e peso influenzano l'adattamento dei bovini da carne di ristallo (Lombardia).]** *Atti della Societa' Italiana di Buiatria* 30: 159-165.

Keywords: sex, breeds, weight, adaptation, intensive husbandry, morbidity, movement disorders, functional disorders, disease surveys, statistical methods, epidemiology, farming systems, intensive farming, Italian language, Italy.

Smith, R.A. (1998). **Impact of disease on feedlot performance: a review.** *Journal of Animal Science* 76 (1): 272-274. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Morbidity and mortality of feedlot cattle have a variety of causes. Compared to respiratory disease, metabolic and digestive disorders generally are less prevalent and occur later in the feeding period. In addition to the obvious costs related to animal death and medication, subsequent performance of sick cattle often is depressed substantially. Closer coordination between veterinarians, nutritionists, and feedlot managers should help reduce the incidence of morbidity and mortality of feedlot cattle.

Keywords: feedlots, dry lot feeding, acidosis, bloat, polioencephalomalacia, feed intake, rumen metabolism, diagnosis, restricted feeding, social behavior, morbidity, mortality, performance, metabolic disorders, digestive disorders, respiratory diseases.

Smith, R.A.; Griffin, D.D.; Dargatz, D.A. (1997). **The risks and prevention of contamination of beef feedlot cattle: the perspective of the United States of America.** *Revue Scientifique et Technique: Office International des Epizooties* 16 (2): 359-368.

NAL Call Number: SF781.R4

Keywords: beef cattle, feedlots, public health, residues, disease control, contamination, beef, food hygiene, food safety, food poisoning, foodborne diseases, animal husbandry, meat hygiene, *Escherichia coli*, *Salmonella*, USA.

Soares, C.O.; Souza, J.C.P.; Madruga, C.R.; Madureira, R.C.; Massard, C.L.; Fonseca, A.H. (2000). **Seroprevalence of *Babesia bovis* in cattle in the "Norte Fluminense" mesoregion.** *Esquisa Veterinaria Brasileira* 20(2): 75-79, ISSN: 0100-736X.

NAL Call Number: SF756.37.B7P5

Keywords: sex, female, male, breed, dairy cattle, beef cattle, location, differences in seroprevalence, *Babesia bovis*, Enzyme, Linked Immunosorbent Assay (ELISA), Portuguese language, Brazil.

Speer, N.C.; Young, C.; Roeber, D. (2001). **The importance of preventing Bovine Respiratory Disease: A beef industry review.** *Bovine Practitioner* 35 (2): 189-196, ISSN: 0524-1685.

NAL Call Number: SF779.5 A1B6.

Keywords: value integration, vertical cooperation, preconditioning programs, decrease morbidity, increase BRD resistance, reduce stress, prior to and after shipment, cost of disease prevention programs, maximize net returns, review.

Spire, M.F.; Drouillard, J.S.; Galland, J.C.; Sargeant, J.M. (1999). **Use of infrared thermography to detect inflammation caused by contaminated growth promotant ear implants in cattle.** *Journal of the American Veterinary Medical Association* 215(9): 1320-1324.

NAL Call Number: 41.8 Am3.

Keywords: beef cattle, ears, trenbolone, estradiol, implantation, contamination, thermography, skin temperature, abscesses.

Spradbery, J.P.; Tozer, R.S. (1996). **The efficacy of diazinon impregnated ear tags against buffalo fly and resulting weight gains and diazinon residues in meat and milk.** *Australian Veterinary Journal* 73 (1): 6-10, ISSN: 0005-0423.

NAL Call Number: 41.8 Au72

Keywords: body weight, buffalo fly control (*Haematobia irritans exigua*) butterfat, lactation, organophosphorus insecticide, Diazinon, treatment.

Strachan, N.J.C.; Dunn, G.M.; Ogden, I.D. (2002). **Quantitative risk assessment of human infection from Escherichia coli O157 associated with recreational use of animal pasture.** *International Journal of Food Microbiology* 75 (1-2): 39-51, ISSN: 0168-1605.

NAL Call Number: QR115 I57

Keywords: Escherichia coli O157, pathogen, cattle, human, host, Monte Carlo simulations, mathematical method, animal pastures, recreational use health hazards, bacterial shedding, quantitative microbial risk assessments, methodologies, survey results.

Szucs, E.; Mezes, M.; Acs, I.; Barandi, Z.; Tran, A.T.; Abraham, M. (1996). **Relation of stress susceptibility to meat quality in beef cattle.** *Journal of Animal Science* 74 (SUPPL. 1): 167, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: ACTH, beef performance, biobusiness, cholesterol, drip loss, foods, free fatty acid, glucose, meat quality, meeting abstract, stress susceptibility.

Taylor, L.F. (1998). **Outbreak of fibrinous pneumonia in recently weaned beef calves in southern Queensland.** *Australian Veterinary Journal* 76 (1): 21-24, ISSN: 0005-0423.

NAL Call Number: 41.8 Au72

Keywords: beef calves, Hereford, Herford crosses, breed, respiratory diseases, fibrinous pneumonia, diagnosis, outbreaks, morbidity, treatment, drug therapy, mortality, oxytetracycline, bacterial diseases,, Pasteurella haemolytica, Queensland, Australia, New South Wales.

Taylor, L.F.; Booker, C.W.; Jim, G.K.; Guichon, P.T. (1997). **Sickness, mortality and the buller steer syndrome in a western Canadian feedlot.** *Australian Veterinary Journal* 75 (10) 732-736, ISSN: 0005-0423,

NAL Call Number: 41.8 Au72.

Abstract: Medical records of 78 445 male cattle that entered a 24 000-head feedlot in Alberta, Canada, between August 1991 and November 1993 were reviewed. The prevalence of dominance behaviour increased with increasing age of cattle on arrival at the feedlot. Sickness and mortality decreased with increasing age on arrival but increased in cattle exposed to aggressive bulls. Sickness and dominance behaviour mostly occurred within the first 30 days of the feeding period. Pens of cattle with a high prevalence of bullers did not have a correspondingly high prevalence of sickness or mortality. It is suggested that dominance behaviour is correlated with sickness in feedlot steers.

Keywords: age, buller-steer-syndrome, dominance, behavior, feedlot, mortality, sickness, Western Canada. Copyright© 2003, CAB International

Thomas, G.D.; Skoda, S.R.; Berkebile, D.R.; Campbell, J.B. (1996). **Scheduled sanitation to reduce stable fly (Diptera: Muscidae) populations in beef cattle feedlots.** *Journal of Economic Entomology* 89 (2): 411-414, ISSN: 0022-0493.

NAL Call Number: 421 J822

Keywords: beef cattle feedlot, biobusiness, economic entomology, stable flies, miscellaneous method, pest, pest assessment control, management, pest control, sanitation.

Thompson, K.W.; Smalling, J.D.; Saxton, A.M.; Schrick, F.N. (1997). **Predictors of dystocia in replacement beef heifers.** *Journal of Animal Science* 75 (SUPPL. 1): 235, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: heifers, Angus, Polled Hereford, dystocia, pelvimetry, calf birth weight, disease predictor, pelvic area, disease predictors, weaning hip height, weaning weight, yearling hip height, yearling weight.

Toombs, R.E.; Grotelueschen, D.M.; Glock R.D.; Salman, M.D.; King, M.E.; Odde, K.G. (1998). **Postnatal calf losses in beef herds: Causes and epidemiological characteristics.** *Large Animal Practice* 19 (4): 16, 18, 20, 22, 23, ISSN: 1092-7603.

NAL Call Number: SF601 B6.

Keywords : beef herds, management practices, morbidity, mortality, postnatal calf loss, neonatal disease preventative health measures.

Valcour, J.E.; Michel, P.; McEwen, S.A.; Wilson, J.B. (2002). **Associations between indicators of livestock farming intensity and incidence of human Shiga toxin-producing Escherichia coli infection.** *Emerging Infectious Diseases* 8 (3): 252-257, ISSN: 1080-6040.

NAL Call Number: RA648.5 E46

Keywords: Escherichia coli, pathogen, human, shiga-toxin, toxin, liquid spreader, field equipment, livestock density indicators, analytical method, solid spreader, field equipment, livestock farming intensity.

Van Rooyen, C. (1998). **Adaptability of cattle. [Aanpasbaarheid sorg vir meer geld.]** *Landbouweekblad* 1055: 11, 13, 15.

Keywords: adaptability, metastigmata, hides and skins, thermal stress, pest resistance, resistance to injurious factors, Afrikaans language, South Africa.

Varona, L.; Misztal, I.; Bertrand, J.K. (1999). **Threshold, linear versus linear, linear analysis of birth weight and calving ease using an animal model: II. Comparison of models.** *Journal of Animal Science* 77 (8): 2003-2007, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: dystocia, reproductive system linear analysis, mathematical method, threshold, linear analysis, mathematical method, breeding, birth weight, calving difficulty, reproductive capacity, variance component estimation, Bayesian analysis.

Wagner, B.A.; Dargatz, D.A.; Salman, M.D.; Morley, P.S.; Wittum, T.E.; Keefe, T.J. (2002). **Comparison of sampling techniques for measuring the antimicrobial susceptibility of enteric Escherichia coli recovered from feedlot cattle.** *American Journal of Veterinary Research* 63 (12): 1662-1670, ISSN: 0002-9645.

NAL Call Number: 41.8 Am3A.

Abstract: To evaluate the effectiveness of various sampling techniques for determining antimicrobial resistance patterns in Escherichia coli isolated from feces of feedlot cattle. Sample Population: Fecal samples obtained from 328 beef steers and 6 feedlot pens in which the cattle resided. Procedure: Single fecal samples were collected from the rectum of each steer and from floors of pens in which the cattle resided. Fecal material from each single sample was combined into pools containing 5 and 10 samples. Five isolates of Escherichia coli from each single sample and each pooled sample were tested for susceptibility to 17 antimicrobials. Results: Patterns of antimicrobial resistance for fecal samples obtained from the rectum of cattle did not differ from fecal samples obtained from pen floors. Resistance patterns from pooled samples differed from patterns observed for single fecal samples. Little

pen-to-pen variation in resistance prevalence was observed. Clustering of resistance phenotypes within samples was detected. **Conclusions and Clinical Relevance:** Studies of antimicrobial resistance in feedlot cattle can rely on fecal samples obtained from pen floors, thus avoiding the cost and effort of obtaining fecal samples from the rectum of cattle. Pooled fecal samples yielded resistance patterns that were consistent with those of single fecal samples when the prevalence of resistance to an antimicrobial was >2%. Pooling may be a practical alternative when investigating patterns of resistance that are not rare. Apparent clustering of resistance phenotypes within samples argues for examining fewer isolates per fecal sample and more fecal samples per pen.

Keywords: *Escherichia coli* (Enterobacteriaceae), pathogen, beef cattle, feces, bacterial disease, amikacin, antibacterial, drug resistance, anti-infective drug, amoxicillin-clavulanic acid, ampicillin, apramycin, ceftiofur, ceftriaxone, cephalothin, chloramphenicol, ciprofloxacin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfamethoxazole, tetracycline, trimethoprim-sulfamethoxazole, fecal sampling, clinical techniques, diagnostic techniques, antimicrobial susceptibility, feedlot, housing.

Waldner, C. (2001). **Monitoring beef cattle productivity as a measure of environmental health.** *Environmental Research* 86(1): 94-106, ISSN: 0013-9351.

NAL Call Number: RA565 A1E5

Keywords: sentinels, environmental health, productivity, health data, natural gas developments, sour natural gas processing plant, biological accounting methods, nonpregnancy, abortion, calving late, stillbirth, calf mortality rates, comparison with published data.

Waldner, C.L.; Ribble, C.S.; Janzen, E.D.; Campbell, J.R. (2001). **Associations between oil- and gas-well sites, processing facilities, flaring, and beef cattle reproduction and calf mortality in western Canada.** *Preventive Veterinary Medicine* 50(1-2): 1-17, ISSN: 0167-5877.

NAL Call Number: SF601 P7.

Keywords: beef cows, cow-calf herds, pastured near active and inactive oil and natural-gas sites, batteries, compressor stations and processing plants, sour-gas flaring, health risks, environmental epidemiology, pregnancy status, calving interval, occurrence of twins, abortions, stillbirths, neonatal mortality, air-monitoring devices, hydrogen sulfide deposition, Canada.

Waldner, C.L.; Ribble, C.S.; Janzen, E.D.; Campbell, J.R. (2001). **Associations between total sulfation, hydrogen sulfide deposition, and beef-cattle breeding outcomes in western Canada.** *Preventive Veterinary Medicine* 50(1-2): 19-33, ISSN: 0167-5877.

NAL Call Number: SF601 P7.

Keywords: beef cows, cow-calf herds, pastured near oil- and gas-production facilities, health risks, pregnancy status, calving interval, occurrence of twins, abortions, stillbirths, neonatal mortality, air-monitoring devices, hydrogen sulfide deposition, Canada.

Wikse, S.E.; Field, R.W.; Holland, P.S.; Barling, K.S. (1999). **Clinical response trials in beef cattle practice.** *Compendium on Continuing Education for the Practicing Veterinarian* 21(Supplement 4): S137-S143, ISSN: 0193-1903.

NAL Call Number: SF601 C66.

Keywords: veterinary services, economics, epidemiology, husbandry.

Wilson, S.C.; Fell, L.R.; Colditz, I.G.; Collins, D.P. (2002). **An examination of some physiological variables for assessing the welfare of beef cattle in feedlots.** *Animal Welfare* 11 (3): 305-316, ISSN: 0962-7286.

NAL Call Number: HV4701.A557.

Keywords: beef cattle, feedlots, stocking density, surfaces, grazing, adrenal glands, weight, blood serum, IgA, t lymphocytes, leukocyte count, animal welfare, immune competence, cell mediated immunity, liveweight gain, IgG, natural killer cells, blood picture, lymphocyte transformation, hypothalamus, hypothalamic regulation, pituitary, dry surface, muddy surface.

Wittum, T.E.; Grotelueschen, D.M.; Brock, K.V.; Kvasnicka, W.G.; Floyd, J.G.; et al. (2001). **Persistent bovine viral diarrhoea virus infection in US beef herds.** *Preventive Veterinary Medicine* 49(1/2): 83-94.

NAL Call Number: SF601 P7.

Keywords: bovine diarrhea virus, persistence, infections, history, clinical aspects, animal husbandry, vaccination, calving season, breeding season, screening, mortality, growth, performance, vertical transmission, pregnancy.

Yeruham, I.; Perl, S.; Nyska, A. (1996) **Skin tumours in cattle and sheep after freeze, or heat, branding.** *Journal of Comparative Pathology* 114 (1): 101-106, ISSN: 0021-9975.

NAL Call Number: 41.8 J82

Keywords: dairy cattle, beef cattle, sheep, freeze-branding, heat-branding, tattooing with liquid nitrogen, carcinogenic epidermal neoplasia, papillomatosis, skin tumors, squamous cell carcinoma.

Zapletal, P.; Burzanski, J. (1996). **Incidence of ectoparasites in cattle in the Beskid Slaski region and their effect on skin quality. [Wystepowanie ektopasozytow u bydla w rejonie Beskidu Slaskiego i ich wplyw na jakosc skory.]** *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 291: 211-216, ISSN: 1232-3071.

Keywords: breeds, Red-and-White, Black-and-White, Red Polish, skin producing, parasites, Mallophaga, skin diseases, lesions, scars, cuts, skin, hides, quality, Poland, Polish language.

Zehnder, C.M.; DiCostanzo, A.; Thate, K.; Gilland, R.; Murphy, M.J.; Halbach, T.R. (2000). **Health and environmental implications of using composted household and yard waste bedding in a cattle feedlot.** *Journal of Animal Science* 78(3): 495-503. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: litter, feedlots, feedlot wastes, refuse compost, crop residues, waste utilization, animal health, heavy metals, cadmium, copper, molybdenum, nickel, lead, zinc, liver, kidneys, mineral content, rain, environmental temperature, cattle manure, blood picture, nitrogen content, phosphorus, Minnesota.

Housing

Achilles, W. (1997). **Model houses for suckler cow herds: Unconventional ideas are in demand.** [Musterstaele fuer Mutterkuh-Herden: Unkonventionelle Ideen sind gefragt.] *Rinderwelt*, 22(4): 8, 10-15, ISSN: 0720-1656.

Keywords: beef cattle cows, animal housing, husbandry, equipment, costs, investment requirements, German language, Germany.

Berg, K. (1996). **Houses for self recruiting beef cattle.** [Hus for sjøelvrekrutterende kjoettfe.] Norges Landbrukshoegskole. Institutt for Tekniske: Fag Aas, Norway, No. 7, 14p., ISSN: 0804-676X.

NAL Call Number: S760.N7P56

Keywords: cattle sheds, stalls, litter bedding, ventilation, costs, Norwegian language, Norway.

Bogdanovic, V.; Petrovic, M.(2002). **Influence of rearing system on the growth of beef bulls.**[Uticaj nacina odgajivanja do zalucenja na rast bikova u performans testu.] *Biotechnology in Animal Husbandry* 18 (1/2): 1-10, ISSN: 1450-9156.

Keywords: beef cattle, breed differences, Marchigiana, Chianina, Romagnola bulls, husbandry, rearing systems, stall fed, pasture grazed, mixed, growth, growth rate, liveweight gain, sire selection, non-genetic sources of variation, Serbian language.

Brown-Brandl, T.M.; Nienaber, J.A.; Eigenberg, R.A.; Hahn, G.L.; Freetly, H. (2003).

Thermoregulatory responses of feeder cattle. *Journal of Thermal Biology* 28 (2):149-157, ISSN: 0306-4565.

NAL Call Number: QP82.2 T4J6

Abstract: A study was designed to investigate the thermoregulatory responses of feeder cattle to both acute and chronic exposures to elevated environmental temperatures. Rectal temperatures (RT) and respiration rate (RR) showed significant differences between temperature treatments. Both RT and RR had a diurnal pattern, which followed the diurnal pattern of the ambient conditions with some lag. Heat production at thermoneutral conditions was significantly higher than at the heat stress treatments. Heat production and respiratory quotient were the only two parameters shown to change with acclimation to heat stress.

Keywords: body temperature, environmental temperature, heat production, heat stress, heat stress acclimation, rectal temperature, respiration rate, thermoregulatory response.

Buescher, W.; Jungbluth, T. (1996). **News about keeping technique of beef cattle.**

[Neuheiten in der Haltungstechnik Rindermast.] *LAF-Informationen* 4(1): 47-61, ISSN: 0944-5358.

Keywords: bulls, calves, fattening, site factors, housing, costs, ventilation, winds, velocity, straw, animal litter, feeding, cereal byproducts, German language

Cielejewski, H. (1997). **Experience with cold housing for dairy cows.** [Erfahrungen mit Kaltstallen fur Milchvieh.] *Landtechnik* 52 (4): 204-205, ISSN: 0023-8082.

NAL Call Number: S675 L32

Keywords: beef cattle, dairy cows, winter, cold zones, cold resistance, cold tolerance, frost, temperature, snow, cattle housing, non-insulated cowsheds, animal behavior, animal welfare, dairy farming, human factors, German language, Germany.

Clowe, D.E.; Steen, R.W.J.; Beattie, V.E.; Moss, B.W. (2001). **The effects of floor type systems on the performance, cleanliness, carcass composition and meat quality of housed finishing beef cattle.** *Livestock Production Science* 69(1): 33-42, ISSN: 0301-6226. **NAL Call Number:** SF1 L5.

Keywords: cattle housing, floor type, rubber strips, mats, slatted floors, straw, carcass composition, carcass weight, hygiene, live weight, meat quality.

Demir, Y. (1999). **The current situation regarding buildings and the problems of beef cattle farming in Corum.** [Corum ili besi sigirciligi isletmelerinin mevcut durumu ve sorunlarinin belirlenmesi uzerine bir arastirma.] *Ondokuz Mayis Universitesi, Ziraat Fakultesi Dergisi* 14 (1): 81-92.

Keywords: beef cattle, cattle housing, surveys, barn design, lighting, planning, guidelines, ventilation, feeding, Turkish language, Turkey.

Demmers, T.G.M.; Burgess, L.R.; Short, J.L.; Phillips, V.R.; Clark, J.A.; Wathes, C.M. (1997). **The use of pressure difference measurements in determining ammonia emissions from a naturally-ventilated UK beef building.** In: *Livestock environment 5, Volume 2. Proceedings of the Fifth International Symposium, Bloomington, Minnesota, USA, 29-31 May, 1997*, Bottcher, R. W., Hoff, S. J. (eds.), American Society of Agricultural Engineers (ASAE): St Joseph, USA, pp.154-162, ISBN: 0-929355-84-9.

NAL Call Number: SF91 L58 1997

Keywords: beef cattle housing, naturally ventilated, emission, ammonia, air pollution, air flow, pressure difference measurements, straw bedding, slurry, United Kingdom.

Derno, M.; Jentsch, W.; Matthes, H.D.; Loehrke, B. (1997). **Metabolism and physiological reactions on environmental temperature in beef cattle breeds.** [Stoffwechsel und physiologische Reaktionen auf die Umgebungstemperatur bei Fleischrindrassen.] In: 3. *Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.]* FAL: Braunschweig-Voelkenrode, Germany, pp. 125-137, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: environmental temperature, thermoregulation, cold, heat, stress, digestion, digestibility, nutritive value, animal needs, energy, Germany, European Union, German language.

Faerevik, G.; Boee, K.E. (2000). **Beef Cattle on Slatted Floors: a Field Study in Western Norway.** [Hold Av Kjoettfe Paa Spaltegulv: Feltundersoekelse Paa Vestlandet.] Norges Landbrukshoegskole: Institutt for Tekniske Fag Aas, Norway, ITF-Repot (Norway) No. 114, 15 p., ISSN: 0805-7257.

Keywords: housing, slatted floors, dimensions, cattle sheds, stalls, lesions, damage, claws, veterinary hygiene, animal welfare, Norwegian language, Norway.

Fisher, A.D.; Crowe, M.A.; O'Kiely, P.; Enright, W.J. (1997). **Growth, behaviour, adrenal and immune responses of finishing beef heifers housed on slatted floors at 1.5, 2.0, 2.5 or 3.0 m² space allowance.** *Livestock Production Science* 51 (1/3): 245-254, ISSN: 0301-6226. **NAL Call Number:** SF1 L5.

Keywords: Simmental crossbred heifers, cattle housing, slatted floors, space allowance, immune response, stress, adrenocorticotrophic hormone challenge, animal behavior, lying, eating, ruminating, social behavior, aggression, growth, comfort, animal welfare.

Fisher, A.D.; Crowe, M.A.; Prendiville, D.J.; Enright, W.J. (1997). **Indoor space allowance: effects on growth, behaviour, adrenal and immune responses of finishing beef heifers.** *Animal Science: An International Journal of Fundamental and Applied Research* 64 (1): 53-62, ISSN: 0003-3561.

NAL Call Number: SF1 A56.

Keywords: heifers, cattle housing, pens, space allowance, immune response, ACTH challenge, growth, serial blood samples, hematology, stress, animal behavior, finishing, animal welfare, hydrocortisone, weight gain.

Fritzsche, S.; Beck, J.; Muller, G. (1996). **Outside climate stalls for beef cows. [Aussenklimastall fur mutterkuhe.]** *Landtechnik* 51 (1): 28, ISSN: 0023-8082
NAL Call Number: S675 L32

Keywords: cattle housing, loose housing, round poles, yard, covered cubicles, German language, Germany.

Gould, D.H.; Dargatz, D.A.; Garry, F.B.; Hamar, D.W.; Ross, P.F.; et al. (2002). **Potentially hazardous sulfur conditions on beef cattle ranches in the United States.** *Journal of the American Veterinary Medical Association* 221 (5): 673-7, ISSN: 0003-1488.

NAL Call Number: 41.8 Am3

Abstract: To analyze the sulfur content of water and forage samples from a geographically diverse sample of beef cow-calf operations in the United States and to estimate frequency and distribution of premises where forage and water resources could result in consumption of hazardous amounts of sulfur by cattle. **DESIGN:** Cross-sectional study. **SAMPLE POPULATION:** 709 forage samples from 678 beef cow-calf operations and individual water samples from 498 operations in 23 states. **PROCEDURE:** Sulfur content of forage samples and sulfate concentration of water samples were measured. Total sulfur intake was estimated for pairs of forage and water samples. **RESULTS:** Total sulfur intake was estimated for 454 pairs of forage and water samples. In general, highest forage sulfur contents did not coincide with highest water sulfate concentrations. Overall, 52 of the 454 (11.5%) sample pairs were estimated to yield total sulfur intake (as a percentage of dry matter) $\geq 0.4\%$, assuming water intake during conditions of high ambient temperature. Most of these premises were in north-central ($n = 19$) or western (19) states. **CONCLUSIONS AND CLINICAL RELEVANCE:** Results suggest that on numerous beef cow-calf operations throughout the United States, consumption of forage and water could result in excessively high sulfur intake. All water sources and dietary components should be evaluated when assessing total sulfur intake. Knowledge of total sulfur intake may be useful in reducing the risk of sulfur associated health and performance problems in beef cattle.

Keywords: feed, food contamination, sulfur analysis, water chemistry, disease, prevention and control, sulfur, adverse effects, USA.

Hartmann, J.; Schlichting, M.; Langholz, H.J. (1996). **Studies on improving beef testing systems on station. 2. Automation of feeding of standardized test diet. [Untersuchungen zur Weiterentwicklung der Stationsprufung auf Fleischleistung beim Rind. 2.]**

Automatisierung der Fütterung einer Standardprufdiat] *Archiv für Tierzucht* 39 (2): 107-119, ISSN: 0003-9438.

NAL Call Number: 49 AR23.

Keywords: bulls, housing systems, automation, transponders, equipment, floors, straw, litter, slatted floors, behavior, feed intake, estimation, automatic feed dispensers, German language.

Hilty, R.; Stadelmann, H. (1996). **New building concept for cattle finishing, functional and husbandry aspects of alternative management patterns.** [Neue Buakonzeppte der Rindviehmast, Funktionelle und wirtschaftliche Aspekte alternativer Haltungsformen.] FAT-Berichte, Switzerland (No. 477), Eidgenössische Forschungsanstalt für Agrarwirtschaft und Landtechnik (FAT): Tanikon, Switzerland, 8 p., ISSN: 1018-502X .

NAL Call Number: S671.B55

Keywords: cattle housing, animal welfare, animal behavior, loose housing, feeding and lying areas, new designs, operating, costs, labor requirements, evaluation, German language, Switzerland.

Hilty, R.; Stadelmann, H. (1996). **New concepts of construction for fattening cattle.** [Nouveaux concepts de construction pour l'engraissement des bovins.] *Technique Agricole* 58 (4): 23-32

Keywords: cattle housing, alternatives to cubicle systems, interconnected feeding design, exercise, rest areas, labor requirements, French language, Switzerland.

Jaubourg, J., Mazoyer, J.; Lablanquie, M.; Baud, G. (1996). **Arrangements for promoting open-air wintering of suckling heifers.** [Quels aménagements pour favoriser l'hivernage en plein air de génisses allaitantes?] *Ingenieries* 8: 23-30, ISSN: 1264-9147.

Keywords: heifers, wintering, housing, pollution control, environmental protection, livestock management, France, French language.

Kapuinén, P. (2001). **Deep litter systems for beef cattle housed in uninsulated barns, Part 1: height increase, carrying capacity and specific counter-pressure of aeration of deep litter.** *Journal of Agricultural Engineering Research* 79(4): 419-428, ISSN: 0021-8634.

NAL Call Number: 58.8 J82

Keywords: aeration, barns, housing, cattle manure, soiling, deep litter housing, litter, peat, simulation, straw, wood chips.

Kavolelis, B. (1998). **Estimation of temperature conditions in animal houses with thermally insulated and uninsulated constructions. Actual tasks on agricultural engineering.** In: *Proceedings 26th International Symposium on Agricultural Engineering, Opatija, Croatia, 3-6 February 1998*, Filipovic, D.(ed.), Zavod za Mehanizaciju Poljoprivrede, Agronomski Fakultet Sveucilista a Zagrebu: Zagreb, Croatia, pp. 335-341, ISBN: 953-6135-23-X.

Keywords: cattle housing, temperature, mathematical models, heat loss, heat transfer, closed versus open wall design.

Kirkland, R. M., Steen, R. W. J. (2001). **Studies on the effects of housing system on the behaviour, welfare and performance of beef cattle and on factors affecting the cleanliness of housed cattle.** In: *Agricultural Research Institute of Northern Ireland, 2000-2001*, Agricultural Research Institute of Northern Ireland: Northern Ireland, UK, pp.30-39.

Abstract: The following article reviews findings based on a series of investigations on animal welfare aspects of the type of flooring used for beef cattle in Northern Ireland and its effects on animal production and carcass parameters as well as cleanliness, and on factors affecting cleanliness of beef cattle, including the level and type of concentrates as well as the type of grass silage fed. Floor type was not found to affect the performance, carcass composition, meat quality and behaviour of the animals, suggesting that welfare problems are of minor when cattle are accommodated on slatted floors during the winter period following summer at pasture. Similarly, there was no additional return to farmers, in terms of higher performance, from the use of straw-bedded systems. Cattle were not consistently cleaner on straw beds compared with slatted systems. However, considering the behavioural, physiological and pathological measures, and the practicalities of local production systems, the present data suggest that if welfare is of major concern, it may be improved by using rubber strips attached to slats in the slatted systems. On the basis of animal cleanliness studies, the quality of ventilation in the animal house was found to be of major importance. The inlet: outlet ratio and internal air volume must be adequate to maintain a fresh internal environment. The construction of slatted housing systems must minimize the proportion of solid concrete in the pen floor and maximize voidage in the pens. Contrary to current views, increasing stocking density in slatted pens did not result in cleaner cattle. As mixing of genders was found to promote dirtiness, steers and heifers should be housed in separate pens. Considering the effects of diet on cleanliness, good quality, well fermented, first-cut silage should be provided to finishing cattle, whereas, low DM silages, harvested as multiple re-growths should be avoided. Silages must be supplemented with a moderate amount of concentrates formulated to contain low levels of ash, fibre and oil. Low DM feed supplements such as potatoes, fodder beat and brewers grains should be avoided during the finishing period.

Keywords: animal housing, animal husbandry, animal welfare, beef cattle, carcass quality, cattle feeding, concentrates, fattening performance, feed supplements, floor type, meat hygiene, silage, slatted floors, stocking density, ventilation, winter, Northern Ireland, United Kingdom. Copyright© 2003, CAB International

Koerkamp, P.W.G.G.; Metz, J.H.M.; Uenk, G.H.; Phillips, V.R.; Holden, M.R.; Sneath, R.W.; Short, J.L.; White, R.P.; Hartung, J.; Seedorf, J.; Schroder, M.; Linkert, K.H.; Pedersen, S.; Takai, H.; Johnsen, J.O.; Wathes, C.M. (1998). **Concentrations and emissions of ammonia in livestock buildings in Northern Europe.** *Journal of Agricultural Engineering Research* 70(1): 79-95, ISSN: 0021-8634.

NAL Call Number: 58.8 J82

Keywords: pig, cattle, poultry, housing, ammonia emissions, concentration, air pollution, seasonal variation, animal health, England, Netherlands, Germany, Denmark.

Kosako, T.; Imura, T. (1999). **Effect of housing conditions and human contact on temperament of Japanese black calves.** *Animal Science Journal* 70(9): 205-210, ISSN: 1344-3941.

NAL Call Number: SF1 A542.

Keywords: animal housing, handling, meat animals, Japanese language, Japan.

Lefcourt, A.M.; Adams, W.R. (1998). **Radiotelemetric measurement of body temperature in feedlot steers during winter.** *Journal of Animal Science* 76(7): 1830-1837. ISSN: 0021-8812.

NAL Call Number: 49 J82 .

Abstract: Little is known concerning body temperature regulation in cattle under conditions of low ambient temperature. To investigate the influence of cold on body temperature regulation, core body temperatures of feedlot steers (crossbred *Bos taurus*) were monitored for two winters in Nebraska, from late December to mid-March in yr 1 and from late December through June in yr 2. In yr 1, radio transmitters to monitor temperature were implanted in the peritoneum of five steers (360 kg); in yr 2, four steers (320 kg) were used. Body temperatures and ambient temperatures were recorded at 3-min intervals and were mathematically filtered to produce 120 readings/d. For yr 1 and 2, daily maximum (40.09 and 39.66 degrees C), minimum (38.78 and 38.64 degrees C), and average (39.29 and 39.06 degrees C) body temperatures were not affected by ambient temperatures. Body temperatures exhibited circadian rhythms with the minima at approximately 0800 and the maxima at approximately 1900. For both years, sharp peaks in body temperature were often seen in the evening and, for yr 2, to a lesser extent in the morning. The occurrence of peak was normally congruent, within a 1.5-h window across steers. Congruent peaks in the evening with peak heights of 1.05 and .77 degrees C occurred on 65 and 56% of the days in yr 1 and 2, respectively. Occurrence of congruent peaks was correlated with dusk; peak followed dusk by 30 to 60 min. Ambient temperature also influenced the occurrence of peaks; few peak were observed when average daily ambient temperatures were below 7.5 degrees C. The dynamic changes in body temperature throughout the day, including the peaks in body temperature after dusk, strongly suggest that thermoregulatory systems in steers respond not only to current ambient conditions, but also to more integrative measures such as day length and daily heat load.

Keywords: beef steers, feedlots, dry lot feeding, body temperature, winter, cold stress, hypothermia, data collection, circadian rhythm, Nebraska.

Lowe, D.E.; Steen, R.W.J.; Beattie, V.E.; Moss, B.W. (2001). **The effects of floor type systems on the performance, cleanliness, carcass composition and meat quality of housed finishing beef cattle.** *Livestock Production Science* 69(1): 33-42.

NAL Call Number: SF1 L5.

Keywords: steers, finishing, meat quality, carcass composition, performance, cattle housing, hygiene, floors, solid floors, slatted floors, litter, rubber, carcass weight, live weight gain, duration, beef quality, floor type, mats.

Lowe, D.E.; Steen, R.W.J.; Beattie, V.E. (2000). **An assessment of lameness in finishing beef cattle accommodated on different floor types over the winter months.** *Irish Journal of Agricultural and Food Research* 39(3): 478, ISSN: 0791-6833.

NAL Call Number: S539.5 I74.

Keywords: beef, finishing, fully-slatted floor, lameness, assessment, perforated rubber mat, fully-slatted, secured rubber strips, fully-slatted, straw bedded solid floor, seasonal effects, winter.

Lowe, D.E.; Steen, R.W.J.; Beattie, V.E. (2000). **The effect of floor type in winter housing on the behaviour of finishing beef cattle.** *Irish Journal of Agricultural and Food Research* 39(3): 481, ISSN: 0791-6833.

NAL Call Number: S539.5 I74.

Keywords: floor type, animal behavior, lying down, rising, winter housing.

Lowe, D.E.; Steen, R.W.J.; Beattie, V.E. (2000). **Preference testing of floor types by finishing beef cattle.** *Irish Journal of Agricultural and Food Research* 39(3): 481, ISSN: 0791-6833.

NAL Call Number: S539.5 I74.

Keywords: floor type preference; mat floor, sawdust floor, slat floor, straw floor.

Lowman, B.G.; Hinks, C.E.; Hunter, E.A.; Scott, N.A. (1996). **Effect of breed type, sex, method of rearing and winter nutrition on lifetime performance and carcass composition in a 20-month beef system: grazing performance.** *Animal Science: An International Journal of Fundamental and Applied Research* 63(2): 215-222.

NAL Call Number: SF1 A56.

Keywords: grazing, winter, cattle suckling, males, females, body condition, pastures height, weight gain, sex, biological differences, feeding level.

Mader, T.L.; Dahlquist, J.M.; Gaughan, J.B. (1997). **Wind protection effects and airflow patterns in outside feedlots.** *Journal of Animal Science* 75(1): 26-36. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: Steers were finished in three different sets of outside lots: 1) pens with overhead shelter on the north side; 2) pens south and southeast of a shelter belt; and 3) pens with no shelter or windbreak. In trials conducted over a 3-yr period with predominantly British and British x Continental crossbred yearlings, performance improvements due to providing shelter or wind protection in the winter were not detected; however, in the summer, providing wind protection or shelter resulted in decreased ($P < .10$) cattle gains. Cattle fed in the unprotected area had greater ($P < .05$) fat thickness in the winter and greater marbling scores in the winter ($P < .05$) and autumn ($P < .10$) than cattle fed in protected areas. When averaged across facilities, seasonal effects were detected for DMI (autumn > summer > winter > spring; $P < .05$). Feed: gain ratios followed a similar trend among seasons (summer and autumn > winter > spring $P < .05$). As a percentage of BW, winter (2.21), spring (2.19), and summer (2.18) DMI were less ($P < .05$) than autumn (2.35) DMI. Wind velocity data indicated that greater air flow tends to be found on mounds and less at the feedbunk in pens protected by shelter belts. In unprotected, unsheltered pens, the greatest airflow tends to be at the highest point in the pen (bunks and mounds). In Nebraska, benefits realized from feeding cattle in sheltered or protected areas under average or slightly milder than average winter weather conditions may be offset by lower performance experienced by cattle fed in those same areas in the summer. In addition, fat deposition seems to be enhanced in cattle exposed to moderate cold stress.

Keywords: steers, wind protection, shelterbelts, feedlots, wind speed, wind stress, live weight gain, feed intake, dry matter, feed conversion, heat stress, seasonal variation, fat thickness, beef quality, carcass yield, environmental temperature, marbling.

Mader, T.L.; Hahn, G.L.; Gaughan, J.B.; Dahlquist, J.M. (1999). **Shade and wind barrier effects on summertime feedlot cattle performance.** *Journal of Animal Science* 77(8): 2065-2072, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: In each of three summertime trials conducted over consecutive years, approximately 110 predominantly black and black-white-face steers were blocked by weight and randomly allotted to one of 16 pens in a 2 x 2 factorial arrangement of treatments. Factors consisted of cattle being fed in facilities with or without wind barriers and with or

without shade. Steers were fed dry-rolled corn-based diets (1.43 Mcal/kg, NE(g)). Mean starting date and days on feed were June 26 and 79, respectively. In unshaded areas, temperature and humidity averaged 21.6 degrees C and 77.9%, and the blackglobe-humidity index (BGHI) at 1500 averaged between 84.0 and 89.1. Each of four 6.1- x 6.1-m structures (mean height = 3.4 m) with white steel roofs provided shade (2.65 m²/steer) for two pens. In facilities with wind barriers provided, airflow was reduced from the north and northwest by a 25-m-wide shelterbelt containing six rows of trees. For cattle fed in pens with wind barriers, shade increased ($P < .05$) gain from 0 to 56 d and decreased ($P < .05$) DMI/ADG from 0 to 28 d. Differences ($P < .05$) in performance were not found between shaded and unshaded cattle in any portion of the feeding period for cattle fed in the pens without wind barriers and over the entire feeding period in either type of facility. The shade response in pens with wind barriers seemed to be greater the 1st yr than in subsequent years. Differences in weather patterns among years, especially air temperature, humidity, and solar radiation, may partially explain this interaction. Also, in yr 1, cattle tended to have greater fat thickness at finish than in yr 2 and 3. Correlations between BGHI and DMI tended to be greater during the early portion of the trial (0 to 28 d) than over the entire trial. Correlations between the difference in BGHI under shade vs no shade and percentage of shade use had the greatest magnitude and were significant only in the first 28d vs over the entire feeding period. Although no heat-related cattle deaths occurred in this study, results suggest that shade improves cattle performance in the summer when they are fed in facilities with winter wind protection available and have not become acclimated to hot conditions. Once cattle are acclimated or hot conditions subside, compensation by unshaded cattle offsets much of the initial benefits of providing shade.

Keywords: steers, beef cattle, feedlots, shade, wind protection, air temperature, relative humidity, wind speed, live weight gain, feed intake, dry matter, feed conversion, dressing percentage, fat thickness, depot fat, beef quality, liver, abscesses, carcass yield, summer, animal behavior, heat stress, marbling, Nebraska.

Makulska, J.; Weglarz, A. (2000). **Evaluation of progeny rearing results of five beef breeds maintained without cowsheds. [Hodnoceni prubehu odchovu telat peti masnych plemen chovanych v masnych stadech.]** *Collection of Scientific Papers, Series for Animal Sciences: Faculty of Agriculture in Ceske Budejovice* 17(1): 11-17, ISSN: 1212-558X.

NAL Call Number: SF1.S26

Keywords: calves, heifers, bulls, breeds, Simmental, Limousine, Hereford, Salers, Red Angus, evaluation, parturition, reproduction, winter, spring, birth weight, weight gain, weaning, weaning weight, animal performance, body weight, age, milk yield, animal feeding, husbandry methods, Poland.

Matthes, H.D.; Jentsch, W.; Derno, M.; Mohring, H.; Wegner, J.; Pilz, K.; Bittner, G. (1996). **Adaptation of different cattle breeds to yearly outdoor rearing. [Adaptation verschiedener Rinderrassen an die Bedingungen einer ganzjahrigen Freilandhaltung.]** *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 291: 139-149, ISSN: 1232-3071.

Keywords: beef cattle breeds, free range husbandry, body temperature, thermoregulation, adaptation, German language.

Mitlohner, F.M.; Galyean, M.L.; McGlone, J.J. (2002). **Shade effects on performance, carcass traits, physiology, and behavior of heat-stressed feedlot heifers.** *Journal of Animal Science* 80(8): 2043-2050, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cattle, physiology, shading of, body weight, body measurements, carcasses.

Mitlohner, F.M.; Morrow, J.L.; Dailey, J.W.; Wilson, S.C.; Galyean, M.L.; Miller, M.F.; McGlone, J.J. (2001). **Shade and water misting effects on behavior, physiology, performance, and carcass traits of heat-stressed feedlot cattle.** *Journal of Animal Science* 79(9): 2327-35, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: crossbred feedlot heifers, heat stress, behavior, drinking, feeding, walking, standing, lying, physiology, rectal temperature, respiration rate, performance, carcass traits.

Moerchen, F.M.; Jesse, M. (1997). **Development of condition of mother cows after weaning of calves until the next calving in winter stabling and winter outdoor husbandry [Koerperkonditionsentwicklung von Mutterkuehen nach dem Absetzen der Kaelber bis zur nachfolgenden Kalbung in der Winterstall- und Winteraussenhaltung.]** In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. *Studies on Appropriate and Environmentally Friendly Animal Husbandry*, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. *Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.*] FAL: Braunschweig-Voelkenrode, Germany, pp. 8-16, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: beef cattle cows, mothers, heifers, weight, body condition, nutritional status, winter, stabling, extensive husbandry, adipose tissues, backfat, methods, free range husbandry, seasons, Germany, European Union, German language.

O'Hagan, J.C.; Steen, R.W.J. (2000). **An assessment of the relative importance of factors affecting the cleanliness of housed beef cattle.** *Irish Journal of Agricultural and Food Research* 39(3): 478, ISSN: 0791-6833.

NAL Call Number: S539.5 I74.

Keywords: beef, housing, cleanliness, influencing factors, concentrates feeding, dry, wet, floor type, stocking density, ventilation.

Olson, B.E.; Wallander, R.T. (2002). **Influence of winter weather and shelter on activity patterns of beef cows.** *Canadian Journal of Animal Science* 82 (4): 491-501, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: diurnal activity patterns, energy expenditure, energy gain, grazing behavior, standing behavior, windbreak shelter, winter weather, Montana, USA.

Phillips, W.A.; Grings, E.E.; Coleman, S.W.; Short, R.E.; Riley, D.G.; Chase, C.C.; Mayeux, H.S.; Heitschmidt, R.K. (2002). **Winter and spring performance of steer calves reared in temperate or sub-tropic environments and used as stockers on winter wheat pasture in Oklahoma.** *Journal of Dairy Science* 85 (Supplement 1): 147, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: breed, Angus, Romosinuano, calf, adaptation, average daily gain, body weight, climate, feedlot, pasture grazing, seasonality, temperature, Oklahoma, USA.

Phillips, C.J.C.; Johnson, P.N.; Arab, T.M. (1997). **The effect of supplementary light during winter on the growth, body composition and behaviour of steers and heifers.**

Animal Science: An International Journal of Fundamental and Applied Research 65 (2): 173-181, ISSN: 0003-3561.

NAL Call Number: SF1 A56.

Keywords: beef cattle, steers, heifers, carcass composition, growth, photoperiod, supplementary light, body composition, winter, feeding behavior, reproductive behavior, social behavior, sexual behavior, rumination, digestive tract motility, rumen digestion, eating, feeding, body weight, feed conversion efficiency.

Rossi, P.; Gastaldo, A. (2002). **Structural costs of raising beef cattle organically. [Costo delle strutture per l'allevamento biologico dei bovini da carne.]** *Informatore Agrario* 58 (2): 39-44, ISSN: 0020-0689.

NAL Call Number: 281.8 IN32.

Abstract: EC regulation 1804/99 stipulates the maximum numbers of cattle/ha in pasture and maximum numbers/m² in covered and uncovered housing for organic production. Various possibilities for meeting housing regulations (boxes with litter and outside exercise areas) for bullocks and cows are proposed and contrasted with conventional installations. The ideal solution is new buildings but, if this is not easily achieved, the farmer must analyse in detail the cost of adapting existing housing compared with building new. It is estimated that the cost of new multiple box with inclined litter facilities for housing organic beef production would be more than twice that of new conventional stalls. The costs of adapting conventional slotted floors and supplying a paved exercise area would depend on the buildings to be adapted but an average cost might well be 90 - 120 Euros. Provision for the cows and calves would cost less than for bullocks for fattening. Beef cattle are probably the most costly to provide statutory organic housing for, but against these costs must be set possible increased returns.

Keywords: beef cattle, housing, costs, boxes, litter, outside exercise areas, conventional stalls, European Union, organic farming, regulations, Italian language. Copyright© 2003, CAB International

Ruoho, O. (1996). **Elimination of Salmonella infection in a beef herd in a loose housing system. [Salmonellasaneeraus lihanautojen kylmakasvattamossa.]** *Suomen Eläinlaakarilehti* 102 (12): 713-718, ISSN: 0039-5501.

NAL Call Number: 41.8 F49

Keywords: beef cattle housing, cattle diseases, bacterial diseases, disease control, disease transmission, disinfection, zoonoses, Salmonella, Finnish language, Finland

Schauberger, G.; Pilati, P. (1998). **Evaluation of a steady-state balance model to simulate the indoor climate in livestock buildings: a comparison with measurements of a cattle house. [Evaluierung eines quasi-stationären Bilanzmodells zur Stallklimasimulation: Vergleich mit Messungen eines Rindermaststalles.]** *Wiener Tierärztliche Monatsschrift* 85 (2): 49-55, ISSN: 0043-535X.

NAL Call Number: 41.8 T345

Keywords: beef cattle housing, climate, simulation models, carbon dioxide, temperature, humidity, energy balance, German language.

Schmidt, U. (1998). **Wind protection netting in animal housing construction: abridged version. [Windschutznetze im Stallbau: Kurzfassung.]** *KTBL-Arbeitspapier (No. 251)*, KTBL Kuratorium für Technik und Bauwesen in der Landwirtschaft: Darmstadt, Germany, pp. 28-31, ISSN: 0930-0295.

Keywords: cattle housing, unheated livestock houses, netting, polyester fibers, wind protection, reduction in wind speed, German language, Germany.

Schrader, L. (2001). **The behaviour of farm animals and its significance for housing design.** In: *Human-animal relationship: stockmanship and housing in organic livestock systems. Proceedings of the Third NAHWOA Workshop, Clermont-Ferrand, France, 21-24 October 2000*, Hovi, M.; Bouilhol, M. (Eds.), Network for Animal Health and Welfare in Organic Agriculture, University of Reading: Reading, UK, ISBN: 0-7049-1094-2, pp. 54-63.
Keywords: cattle, livestock, abnormal behavior, animal behavior, animal housing, organic farming.

Schrader, L.; Roth, H. R.; Winterling, C.; Brodmann, N.; Langhans, W.; Geyer, H.; Graf, B. (2001). **The occurrence of tail tip alterations in fattening bulls kept under different husbandry conditions.** *Animal Welfare* 10 (2): 119-130, ISSN: 0962-7286.
NAL Call Number: HV4701.A557.

Keywords: fattening bulls, seasons, autumn, body weight, flooring, slatted floors, deep bedding, straw, pen size, tail docking, skin lesions.

Seedorf, J.; Hartung, J.; Schroder, M.; Linkert, K.H.; Pedersen, S.; Takai, H.; Johnsen, J.O.; Metz, J.H.M.; Koerkamp, P.W.G.G.; Uenk, G.H.; Phillips, V.R.; Holden, M.R.; Sneath, R.W.; Short, J.L.; White, R.P.; Wathes, C.M. (1998). **Temperature and moisture conditions in livestock buildings in Northern Europe.** *Journal of Agricultural Engineering Research* 70(1): 49-57, ISSN: 0021-8634.
NAL Call Number: 58.8 J82

Keywords: animal housing, dry bulb air temperatures, moisture, relative humidity, ventilation, cattle housing, cow housing, pig housing, poultry housing, surveys, Northern Europe

Sonnenberg, H. (1998). **Straw comfort: mechanical straw preparation for loose litter livestock husbandry. [Stroh-Komfort - zur mechanischen Strohaufbereitung für die Tierhaltung auf Einstreu.]** *Landtechnik* 53(3): 152-153, ISSN: 0023-8082.
NAL Call Number: S675 L32

Keywords: beef cattle housing, loose litter flooring, long straw, cut straw, chopped straw, processing straw, dust, slurry removal, animal husbandry, German language, Germany.

Suzuki, K.; Oizumi, C.; Kobayasi, M.; Mori, T.; Wakamatu, M.; Sajiki, S. (1999). **Effect of the wind blowing right below down by the fan for the beef cattle house.** *Bulletin of the Chiba Prefectural Livestock Experiment Station* 23: 47-48, ISSN: 0386-5673.
Keywords: housing, winds, drying, climatic factors, meteorological elements.

Ueno, R.; Kurogi, S. (1998). **Effects of floor conditions on the resting behavior and the meat producing performance of beef cattle and lambs.** *Bulletin of the Ishikawa Agricultural College* 28: 1-5, ISSN: 0389-9977.
Keywords: beef cattle, lambs, housing, floor husbandry, sawdust, rice straw, behavior, crop residues, animals, wastes, wood products, wood residues, meat performance, young animals, Japanese language, Japan.

Vandenheede, M.; Nicks, B.; Canart, B.; Dufrasne, I. Shesi, R.; Biston, R.; Lecomte, P. (1996). **Effect of the climatic factors on the use of a shelter by grazing young bulls (in Belgium).** [Influence des conditions climatiques sur l'utilisation d'un abri par des taurillons au paturage.] In: *First meeting on animal productions. Beef production. Jan. 24, 1996, Gembloux, Belgium.* [Premier carrefour des productions animales. La production de viande bovine.] CRA, Service des Relations Publiques, 21 avenue de la Faculte d'Agronomie, B-5030: Gembloux, Belgium, p. A12.

Keywords: beef cattle, climatic factors, air temperature, animal housing, animal welfare, Belgium, French language.

von Boberfeld, W.O.; Sterzenbach, M. (1999). **Outdoor stock keeping of suckler cows during winter concerning site conditions, environment, and forage economics.** *Zeitschrift fuer Kulturtechnik und Landentwicklung* 40 (5, 6): 258-262, ISSN: 0934-666X.

NAL Call Number: S605.A1Z4

Keywords: female, outdoor stock, suckler cow, extensive farming, ensilage characteristics, environmental conditions, forage economics, German language.

Von Borell, E. (1998). **Issues of animal welfare in the housing of cattle and pigs.** *Zuechtungskunde* 70 (6): 436-445, ISSN: 0044-5401.

NAL Call Number: 49 Z8

Keywords: livestock, cattle, swine, housing systems, welfare issues, legislation, EU directives, minimal requirements, certification, consumer attitudes, welfare assessment, behavioral needs, stockperson, human animal interaction, German language.

Wassmuth, R.; Wallbaum, F.; Langholz, H. J. (1999). **Outdoor wintering of suckler cows in low mountain ranges.** *Livestock Production Science* 61 (2/3): 193-200, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: beef cows, Friesian, Galloway, breed differences, body condition, feeding, genetics, outdoor wintering, housing, roofed shelter, straw bedding, body temperature, environment, upland areas, energy metabolism, Germany .

Wojcik, J.; Kamieniecki, H.; Surmacz, F. (1996). **Evaluation of some imported beef cattle breeds adaptation to rearing conditions in the Szczecin province.** [Ocena przystosowania niektorych importowanych ras bydla miesnego do warunkow chowuw wojewodztwie szczecinskim.] *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 291: 189-192, ISSN: 1232-3071.

Keywords: beef cattle, introduced breeds, Hereford, Red Angus, Salers, winter, adaptation, weight gain, housing, outdoors, Poland, Polish language.

Xiccato, G., Trocino, A., Queaque, P. I., Sartori, A., Carazzolo, A. (2002). **Rearing veal calves with respect to animal welfare: effects of housing and solid feed supplementation on growth performance and meat quality.** *Livestock Production Science* 75(3): 269-280. ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Abstract: This study aims to evaluate how rearing techniques that improve veal calf welfare affect growth performance and carcass and meat quality, by comparing both traditional rearing in individual stalls with group rearing in collective pens and exclusive milk feeding with maize grain supplementation. Eighty male calves were raised from 60 days-of-age (live weight 76.4 plus or minus 5.5 kg) until slaughter (at 182 and 189 days-of-age). Both group rearing and maize grain supplementation significantly improved growth performance (final live weight: +7 kg in group-reared calves compared to individually reared calves, and +10 kg

in maize-supplemented calves compared to exclusively milk-fed calves) and carcass conformation, with no differences in dressing percentage. Group rearing increased blood packed cell volume value. Neither the type of housing nor the feeding system significantly modified carcass or meat colour or the main physical and sensory traits of the meat. Carcass fatness and meat ether extract concentration were higher in the calves reared in individual stalls or supplemented with maize grain. Our results suggest that rearing veal calves in pens and providing solid feed supplements may improve growth performance without impairing carcass and meat quality.

Keywords: husbandry, animal welfare, beef cattle, carcass quality, housing, growth, haematocrit, maize, meat composition, meat quality, veal, veal calves. Copyright© 2003, CAB International

Yanar, M.; Tuzemen, N.; Turgut, L.(2000). **Effects of two different environmental conditions on the fattening performance of Brown Swiss bulls.** *Indian Journal of Animal Sciences* 70(9): 972-973, ISSN: 0367-8318.

NAL Call Number: 41.8 IN22

Keywords: cattle housing, beef cattle, meat production, fattening performance, Swiss Brown, growth, humidity, feed intake, environmental temperature, bulls, Turkey.

Husbandry

Adamski, M. (2000). **Problems rearing the calves of beef cattle and their crosses with BW and RW in extensive management [Problematyka odchowu cielat ras miesnych i ich mieszancow z rasami cb i czb w warunkach ekstensywnych.]** *Annals of Warsaw Agricultural University. Animal Science* 35(Suppl.): 49-54, ISSN: 0208-5739.

Keywords: beef calves, introduced breeds, crossbreeding, extensive husbandry, pastoralism, pasture raised, no farm buildings, gestation, parturition, calving ease, body weight gain, Polish language, Poland.

Baker, J.F.; Strickland, J.E.; Vann, R.C. (2000). **Effect of castration on weight gain of beef calves.** *Bovine Practitioner* 34 (2): 124-126, ISSN: 0524-1685.

NAL Call Number: SF779.5 A1B6.

Abstract: Many management practices can be utilized to maximize weight and increase value of calves at weaning. Combining the two management practices of castration and implanting male calves allows producers to maximize weaning weights and avoid discounts for intact males. Crossbred bull calves were randomly assigned at birth to 1 of 3 treatment groups: castrated (n = 22), banded (n = 18) or left intact (n = 20). Calves that were castrated or banded within 24 h after birth received a zeranol implant at that time. Calves in the intact group were castrated at 150 days of age and then implanted, and the calves in the other 2 treatment groups were re-implanted at that time. There were no differences in weaning weight, average daily gain (ADG) or weight per day of age between the 3 treatment groups. Castrating calves shortly after birth reduced stress on the animal compared to castration at a older age (day 150 to weaning). Also, early castration may be more acceptable as an animal welfare issue. It is concluded that combining castration and implanting allows producers to maximize weaning weight of calves as well as reduce the stress of castration at an older age.

Keywords: castration, animal welfare, live weight gain, stress, calves, weaning weight, zeranol, beef cattle, bulls, growth promoters. Copyright© 2003, CAB International

Baumgartner, G. (1997). **Extensively managed husbandry and animal welfare. [Extensive Tierhaltung und Tierschutz.]** In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry Held Dec 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL: Braunschweig-Voelkenrode, Germany, pp. 231-239, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: extensive husbandry, grazing lands; pastures, animal welfare, animal health, legislation, regulations, international agreements Germany, European Union, German language.

Boatto, V.; Rossetto, L. (1999). **From Agenda 2000 good prospects for cattle husbandry. [Da Agenda 2000 nuove prospettive per l'allevamento bovino.]** *Informatore Agrario* 55(14): 29-32, ISSN: 0020-0689.

NAL Call Number: 281.8 IN32.

Keywords: beef cattle, dairy cattle, regulations, production policies, support measures, cost benefit analysis, production economics, international agreements, international organizations, Italian language, European Union, Italy.

Capucille, D.J.; Poore, M.H.; Rogers, G.M. (2002). **Castration in cattle: techniques and animal welfare issues.** *The Compendium on Continuing Education for the Practicing Veterinarian* 24 (9): S66-S73, ISSN: 0193-1903.

NAL Call Number: SF601.C66.

Keywords: beef cattle, castration, calves, surgery, testes, vaccination, lhrh, gnrrh, antibody formation, animal welfare, pain, animal behavior, hydrocortisone, local anesthesia, lidocaine, stress, age differences.

Earley, B.; Crowe, M.A. (2002). **Effects of ketoprofen alone or in combination with local anesthesia during the castration of bull calves on plasma cortisol, immunological, and inflammatory responses.** *Journal of Animal Science* 80 (4): 1044-1052, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: To determine the effects of the anti-inflammatory ketoprofen, alone or with local anesthesia (LA) during castration on cortisol, immune, and acute phase responses, 40 Friesian calves (215 \pm 3.5 kg) were assigned as follows: 1) control, 2) surgical castration (SURG), 3) SURG following ketoprofen (3 mg/kg BW i.v., SURG + K), 4) SURG following LA (9 mL of 2% lidocaine hydrochloride to each testis, SURG + LA), or 5) SURG following LA and K (SURG + LA + K). Total cortisol response was greater ($P < 0.05$) in SURG, SURG + LA, and SURG + K + LA calves than in control calves and was not different between control and SURG + K calves. The interval to peak cortisol was longer ($P < 0.05$) for SURG + K + LA calves than for either SURG or SURG + K calves. On d 3, KLH-induced interferon-gamma production was lower ($P < 0.05$) in SURG calves than in control calves, whereas concanavalin A-induced interferon-gamma production was lower ($P < 0.05$) in all castration groups than in control. On d 1 after surgery, fibrinogen was higher ($P < 0.05$) in SURG and SURG + LA calves than in control calves, whereas SURG + LA + K calves had lower ($P < 0.05$) fibrinogen than did SURG calves. Haptoglobin was higher ($P < 0.05$) in SURG calves on d 1, 3, and 7 than in control calves. On d 1 after surgery, SURG + K and SURG + LA + K calves had lower ($P < 0.05$) haptoglobin concentrations than SURG calves, whereas SURG + K calves had lower ($P < 0.05$) levels than SURG calves on d 3. In conclusion, surgical castration induced a significant elevation in cortisol secretion, the rise in cortisol was reduced to control levels by the administration of ketoprofen but not local anaesthetic. Thus, systemic analgesia using ketoprofen is more effective than local anesthesia during castration to alleviate the associated stress response.

Keywords: acute phase proteins, cortisol plasma concentration, fibrinogen, haptoglobins, hydrocortisone, interferon, ketoprofen, antiinflammatory drug, immunologic drug, immunological effects, inflammatory response effects, pharmacodynamics, pharmacokinetics, plasma cortisol effects, local anesthesia, immunological effects, inflammatory response effects, plasma cortisol effects, surgical castration, behavioral effects, surgical method, immune response, immunological responses, inflammatory responses.

Eng, K.S.; Becthel, R.; Hutcheson, D.P. (2002). **Implant strategies for production of high quality beef for Japanese export market.** *Journal of Dairy Science* 85 (Supplement 1): 101, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: calf, steer, yearling, Ralgro, growth stimulant, hormone drug, implant, Synovex C, Synovex Plus, Synovex S, Japanese export market, USDA quality grade, average daily gain, carcass characteristics, dry matter consumption, feed conversion, meat quality, Japan, Canada.

Fjerdingsby, N.; Waage, S. (2003). **Comparison of two methods for the dehorning of calves.** [Sammenligning av to metoder for avhorning av kalv.] *Norsk Veterinaertidsskrift* 115 (1): 7-15, ISSN: 0332-5741.

NAL Call Number: 41.8 N81.

Keywords: calves, Norwegian Red, breed, crossbred, dehorning, electrical hot-iron tool, Leister-Ghibli, hot-air gun, comparison, sedative, local anaesthetic, plasma cortisol, behavioral testing, human contact test, discomfort, pain, Norwegian language.

Giasuddin, M.; Huque, K.S.; Alam, J. (2003). **Reproductive potentials of gayal (*Bos frontalis*) under semi-intensive management.** *Asian-Australasian Journal of Animal Sciences* 16(3): 331-334, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: *Bos frontalis* (gayal), birth weight, calving interval, conception rate, estrous cycle, gestation period, lactation, milk yield, repeat breeding, reproductive potential, seasonality, semi-intensive management, reproductive diseases, abortion, anestrous, cervicitis, metritis, Bandarban, Bangladesh.

Goonewardene, L.A.; Price, M.A.; Stookey, J.M.; Day, P.A.; Minchau, G. (1997). **Effects of movement frequency, electric prod use and head gate restraint on the behaviour and growth of beef cattle.** *Canadian Journal of Animal Science* 77 (3): 556, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: bull, heifer, electric prodding, animal movement method, movement frequency, behavior, growth rate, head gate restraint.

Gozora, V. (1996). **Crises and strategies in cattle husbandry.** [Krizove stavy a strategie v chove hovadzieho dobytku.] In: *Current problems in production and technology of milk.* [Nove poznatky v technologii vyroby a zpracovani mleka.] Scientific Pedagogical Publishing Ceske Budejovice: Czech Republic, pp. 164-166, ISBN: 80-85645-23-8.

Keywords: beef cattle, production data, production factors, costs, profitability, economics, slovak republic, Slovak language.

Guetter, O. (1997). **Person to animal relationship with a suckler cow herd.** [Untersuchungen zur Mensch-Tier-Beziehung an einer Mutterkuhherde.] In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. *Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany.* [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL: Braunschweig-Voelkenrode, Germany, pp. 240-242, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: beef cattle cows, mothers, human animal relationships, free range husbandry, extensive husbandry, Germany, European Union, German language.

Guiroy, P.J.; Tedeschi, L.O.; Fox, D.G.; Hutcheson, J.P. (2002). **The effects of implant strategy on finished body weight of beef cattle.** *Journal of Animal Science* 80 (7): 1791-1800, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: estradiol, progesterone, testosterone, trenbolone acetate, zeranol, component implant, drug delivery device, Ralgro implant, Revalor implant, Synovex implant, body composition, diet, metabolizable energy, finished body weight.

Hattori, N.; Tobioka, H.; Kinugawa, K.; Fujiwara, N.; Yamamoto, T.; Nishi, R. (1997). **Preliminary application of nursing facilities for calves separated from grazing cows: Suckling milk yield, composition and body weight of calf.** *Proceedings of Faculty of Agriculture - Kyushu Tokai University [Kyushu Tokai Univ., Choyo, Kumamoto (Japan). Faculty of Agriculture]*, 16: 25-31, ISSN: 0286-8180.

NAL Call Number: S471.J3K98

Keywords: beef cattle calves, new nursing system, suckling, weight gain, cow milk yield, grazing, weaning, Japanese language, Japan.

Ingrand, S.; Dedieu, B.; Agabriel, J.; Perochon, L. (2002). **Representation of the beef cattle herd functioning according to the combination of rearing rules: a modelling approach.** [*Modelisation du fonctionnement d'un troupeau bovin allaitant selon la combinaison des regles de conduite. Premiers resultats de la construction du simulateur SIMBALL.*] In: 9emes Rencontres autour des Recherches sur les Ruminants, Paris, France, 4-5 Decembre 2002, Institut National de la Recherche Agronomique, Paris, France, ISBN: 2-84148-045-3.

Keywords: analytical methods, simulation models, beef cattle, suckler herds, husbandry, animal production, French language, France.

Jentsch, W.; Derno, M. (1997). **Aspects of feeding at pasture.** [*Aspekte der Fuetterung in der Freilandhaltung.*] In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. *Studies on Appropriate and Environmentally Friendly Animal Husbandry*, Dec. 5-6, 1996 Trenthorst, Germany. [*Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.*] *FAL: Braunschweig-Voelkenrode, Germany*, pp. 17-31, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: beef cattle cows, mothers, young animals, animal feeding, energy metabolism, thermoregulation, extensive husbandry, free range husbandry, movement, feed intake, rumination, behavior, Germany, European Union, German language.

Jubb, T.F.; Fordyce, G.; Bolam, M.J.; Hadden, D.J.; Cooper, N.J.; Whyte, T.R.; Fitzpatrick, L.A.; Hill, F.; D'Occhio, M.J. (2003). **Trial introduction of the Willis dropped ovary technique for spaying cattle in northern Australia.** *Australian Veterinary Journal* 81 (1-2): 66-70, ISSN: 0005-0423.

NAL Call Number: 41.8 Au72.

Keywords: beef cattle, Brahman, Brahman-Shorthorn, crossbred, female, heifer, Willis dropped ovary technique, ovariectomy, traditional paralumber spaying, traditional vaginal spaying method, animal welfare, body condition, body weight, mortality, pregnancy, Australia.

Jung, K.K.; Sung, S.K.; Choi, C.B. Kim, D.G. Kim, S.G.; Kim, D.Y.; Choi, B.J. (1996). **Effects of castration on the carcass characteristics of Hanwoo and Holstein.** *Korean Journal of Animal Sciences* 38(3): 239-248, ISSN: 0367-5807.

NAL Call Number: 49.9 H19

Keywords: beef cattle, castration, carcasses, chemico-physical properties, organoleptic analysis, statistical methods, Korean language, Korea.

Keane, M.G. (1999). **Effects of time of complete or split castration on performance of beef cattle.** *Irish Journal of Agricultural and Food Research* 38(1): 41-51, ISSN: 0791-6833.

NAL Call Number: S539.5 I74.

Keywords: calves, spring born, Friesian, Charolais X Friesian, performance, complete castration, timing effect, split castration, agricultural method, timing effect.

Kiley-Worthington, M.; Randle, H.D. (1999). **The practicalities and economics of ethologically and ecologically raised double suckled beef.** *Biological Agriculture and Horticulture: An International Journal* 16(4): 381-393.

NAL Call Number: S605.5 B5.

Abstract: It is widely believed that beef production fulfilling the majority of the criteria for ethological and ecological husbandry is less productive and less economic than conventional beef production. It is commonly believed that organic ethologically and ecologically sound beef production must rely on premium prices. The management, production and economic performance from 1990 to 1996 of a herd of double suckling South Devon cattle on an ecological farm within the Dartmoor National Park, U.K., indicates that animal welfare, ecological, public health and aesthetic concerns can be dramatically reduced, and that this can be accompanied by better economic performance than on conventional suckler systems. The management system is outlined and its strengths and weaknesses assessed.

Keywords: economic analysis, ethics, nature conservation, sustainability, organic farming, animal welfare, suckling, animal husbandry, farm management, public health, animal behavior, beef production, England.

Kolle, C. (1996). **Bio-meat for Nestle-Alete: Biologically produced meat from the suckling cow husbandry.** [Biofleisch fuer Nestle-Alete.] *Top agrar spezial. Landwirtschaft aktuell fuer Mecklenburg-Vorpommern* 4: 15-17.

Keywords: dairy cows, beef cattle, cows, organic agriculture, quality, health foods, meat yield, meat performance, meat production, gross margins, operating costs, efficiency, profit, marketing, alternative agriculture, German, German language.

Lienard, G.; Bebin, D.; Lherm, M.; Veysset, P. (1998). **Changes in harvesting and animal-rearing methods on suckler cattle grassland farms. Case of the Charolais (France).** [Evolution des systemes de recolte et d'elevage en exploitations herbageres. Cas du Charolais (France).] *Fourrages* 155: 305-317, ISSN: 0429-2766.

NAL Call Number: 60.8 F82

Keywords: grasslands, zea mays, harvesting, hay, silage, beef cattle, suckler cows, animal husbandry methods, grazing systems, farming systems, burgundy, Limousin, French language, France.

Lyons-Johnson, D. (1998). **Earlier castration reduces stress.** *Agricultural Research* 46(8): 15. Available online at: <http://www.ars.usda.gov/is/AR/archive/aug98/stres0898.pdf>.

NAL Call Number: 1.98 Ag84.

Keywords: castration, age at castration, management practices, surgical castration, banding, liver protein, haptoglobin, stress.

McAllister, T.A.; Cockwill, C.L.; McDowall, J.; Yoakum, J.; Stoddard, H.L.; Tischer, D. (1998). **Development of an indwelling ruminal transponder for electronic identification of beef cattle.** *Journal of Dairy Science* 81 (SUPPL. 1): 277, ISSN: 0022-0302.

NAL Call Number: 44.8 J822

Keywords: indwelling ruminal transponder development, electronic cow identifier.

Moore, D.A.; Sischo, W.M.; Festa, D.M.; Reynolds, J.P.; Atwill, E.R.; Holmberg, C.A. (2002). **Influence of arrival weight, season and calf supplier on survival in Holstein beef calves on a calf ranch in California, USA.** *Preventive Veterinary Medicine* 53 (1/2): 103-115, ISSN: 0167-5877.

NAL Call Number: SF601.P7.

Keywords: beef cattle, liveweight, seasonal variation, survival, newborn animals, colostrum, animal husbandry, purchasing, mortality, risk factors, California, USA.

Mueller, C.; Andreae, U. (1997). **Possibilities to intensify mother cow holding. [Denkbare Intensivierungsmoeglichkeiten bei der Mutterkuhhaltung.]** In: 3. *Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.]* FAL: Braunschweig-Voelkenrode, Germany, pp. 243-250, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: beef cattle cows, mothers, calves, extensive husbandry, milk performance, weaning, animal feeding, animal performance, Germany, European Union, German language.

Neumann, W. (2002). **Current issues in beef meat production with special reference to methods of fattening calves with cows. [Aktuelle fragen zur Rindfleischerzeugung unter besonderer Beruecksichtigung der Haltung von Mutterkuehen]** *Biuletyn Informacyjny Instytut Zootechniki* 40 (3): 17-32, ISSN: 0209-2492.

NAL Call Number: SF1 K7.

Abstract: In the European Union countries, beef cattle breeders make use of both beef and dairy breeds. In the latter case, commercial crossbreeding with beef breeds has been used to improve fattening efficiency and meat quality. After the unification of Germany, the Eastern Lands of Germany were affected by a high decrease in dairy cows and a growth in their yield. The number of un milked cows, used as mothers to rear their offspring, has increased many times with the use of low-cost farm-produced fodders, mainly pastures. The beef demand crisis resulting from the BSE scandal was followed by a renewed interest in beef meat among consumers. Per capita beef consumption is increasing, although it is three times lower in Germany than in the USA. This makes prospects for this type of production, especially the production of high-quality beef graded as U and R under the EUROP system. The Land of Mecklenburg-Vorpommern has favourable conditions for the production of beef cattle. Long-term experience makes it possible to choose the most effective fattening methods and select tried and tested breeds. The most important among the dozen or so beef breeds are Charolais and their crosses with Simmentals (the synthetic line Ucermaerker) as well as Limousin in smaller herds. In pure breeding and crossbreeding (SimmentalXCharolais), these breeds give a desired product while bright colour of fattening cattle is preferred by the buyers. Efficient methods for fattening calves with mothers at pastures were developed and put in practice, often in all-year cycles. Calvings in the early spring season in large herds (March-April) and calvings in the autumn-winter season (November-December) and pasture fattening of older calves with mothers in smaller herds are used. In the latter case, calf mortality is higher but they use pasture more efficiency. The suckling period is the minimum

of 5 to 6 months. By that time, calves should achieve 250 kg (bulls) or 210 kg (calves) of body weight. At 5 months of age, calves should be separated from the bulls. Special attention is paid to the selection of bulls. They are tested for calf size and ease of calving such that calvings take place without breeder's interference and without deaths of calves. Beef cattle production based on rearing calves at pasture is ecological in the full sense of this word. Regardless of the fact that it provides a product of the highest quality, it should be given special subsidies due to its ecological character.

Keywords: beef, breed, Charolais, Limousin x Charolais, Simmental x Charolais, animal breeding, meat product, production, quality, bull selection, calf fattening, cow-based methods, Germany.

Nielsen, B.; Thamsborg, S.M. (2002). **Dairy bull calves as a resource for organic beef production: a farm survey in Denmark.** *Livestock Production Science* 75 (3): 245-255, ISSN: 0301-6226.

NAL Call Number: SF1.L5.

Keywords: beef cattle, organic farming, beef production, dairy bulls, surveys, finishing, ethics, animal husbandry, farmers, farmers' attitudes, interviews, dairy farming, feeds, steers, grazing, Denmark.

Pardo, A.C.J. (1996). **Problems of the extensive husbandry in Spain. [Problemática de la ganadería extensiva en España.]** *Estudios Geográficos* 57(222): 125-149, ISSN: 0014-1496.

Keywords: extensive husbandry, pastoralism, intensification, economics, extensive farming, Spanish language, Southern Europe, Spain.

Podebradsky, Z. (1997). **Economics of cattle husbandry (Pt.2) (Review).** [*Ekonomika chovu skotu, II. díl.*] Ustav Zemedelských a Potravinářských Informací: Prague, Czech Republic, Studijní Informace - Živocisná Vyroba (Czech Republic), No. 4, 67 p., ISSN: 0862-3562.

NAL Call Number: SF1.S78

Keywords: milk production, dairy cows, milk yield, beef cattle, weight gain, weight, feed consumption, feeds, housing, litter for bedding, veterinary services, costs, profit, prices, Czech language, Czech Republic.

Reinhardt, V. (2002). **Artificial weaning of calves: benefits and costs.** *Journal of Applied Animal Welfare Science* 5 (3): 247-251, ISSN: 1088-8705.

NAL Call Number: QL55 H8.

Keywords: husbandry, welfare, beef cattle, calves, cost benefit analysis, weaning.

Revilla, R.; Sanz, A.; Bernu s, A.; Casas s, I. (2002). **Management alternatives in extensive systems. [Alternativas de manejo en los sistemas extensivos.]** *Mundo Ganadero* No. 149 Suppl, p. xii-xvi, ISSN: 0214-9192.

Keywords: suckler cows, beef cattle- extensive husbandry, livestock management, feeding level, body condition, feeding systems, animal performance, husbandry methods, Spanish language.

Rodriguez Castanon, A.A. (1996). **Extensive husbandry in Cantabrian Mountains (Spain). [Ganadería extensiva en la Cordillera Cantábrica.]** *Agricultura* 764: 214-217, ISSN: 0002-1334.

Keywords: extensive husbandry, performance, husbandry methods, farming systems, Spanish language, Spain.

Schwartzkopf-Genswein, K.S.; Stookey, J.M.; Crowe, T.G.; Genswein, B.M.A. (1998).

Comparison of image analysis, exertion force, and behavior measurements for use in the assessment of beef cattle responses to hot-iron and freeze branding. *Journal of Animal Science* 76(4): 972, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: 33 steers were randomly assigned to 3 groups: freeze-branding, (F), hot-iron branding (H) and sham branding (S) treatments. The responses of all steers were videotaped to quantify the amount and intensity of head movements during branding. In addition, the force that steers exerted on the headgate and squeeze chute during branding was recorded using strain gauges and load cells. Behavioural indicators of pain (tail-flicking, kicking, falling and vocalizing) were also recorded. H steers had greater maximum and average head movement distances and velocities than F or S steers, and F steers only had greater maximum values than S animals. The maximum exertion forces obtained from headgate load cells were also greater in H than in F or S steers, however, no differences were observed between H and F treatments for squeeze load cell or headgate strain gauge data. H steers had the greatest incidence of tail-flicks, kicks, falls in the chute and vocalizations, and S steers had the least. It is concluded that H steers experienced more discomfort at the time of branding than F and S steers, and F steers also experienced more discomfort than S steers. Image analysis was a better technique for detecting treatment differences compared with exertion force measurements and frequency counts of during branding.

Keywords: steers, branding, pain, stress, animal behavior, head movement, tail-flicks, kicks, falls, vocalization, animal welfare, freeze branding, hot iron branding, sham branding, headgate squeeze chute.

Schwartzkopf, K.S.; Stookey, J.M.; Depassille, A.M.; Rushen, J.; Watts, J. (1996). **Effect of hot, iron and freeze branding on cortisol levels and pain sensitivity in beef cattle.** *Journal of Animal Science* 74 (SUPPL. 1): 132, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: cortisol, escape behavior, stress-induced analgesia.

Spire, M.F. (1997). **Managing replacement heifers from weaning to breeding.** *Veterinary Medicine* 92 (2): 182-192, ISSN: 8750-7943.

NAL Call Number: 41.8 M69.

Keywords: beef cattle, replacement, heifers, weaning, breeding, animal breeding methods, nutrition, anthelmintics, growth promoters, culling, genetics, animal production, fertility, frame scores, herd size, growth promoting implants.

Staalhammar, H.; Philipsson, J. (1997). **Sex-specific genetic parameters for weaning and post-weaning gain in Swedish beef cattle under field conditions.** *Acta Agriculturae Scandinavica. Section A. Animal Science* 47(3): 138-147, ISSN: 0906-4702.

NAL Call Number: S3.A27

Keywords: extensive husbandry, weaning, genetic parameters, heritability, genetic gain, Sweden.

Steen, S.(1997). **Studies into adaptation of mother cows of Deutsche Schwarzbunte, Deutsche Rotbunte and of crossbreed Galloway x Holstein-Friesian and their offspring during the grazing period. [Studien zur Anpassung der Mutterkuhe der Rassen Deutsch Schwarzbunte, Deutsch Rotbunte und der Kreuzung Galloway x Holstein-Friesian sowie ihrer Nachkommen waehrend des Weideganges.]** In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves

(Mutterkuhhaltung) as Extensive Rearing System. *Studies on Appropriate and Environmentally Friendly Animal Husbandry*, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. *Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung*.] FAL: Braunschweig-Voelkenrode, Germany, pp. 88-109, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: calves, cows, mothers, dairy cows, colostrum, immunity, immunoglobulins, extensive husbandry, intensive husbandry, Germany, European Union, German language.

Steinhardt, M.; Thielscher, H.H. (1997). **Body constitution traits and rearing performance in German Red and White, German Black and White Breed and in crosses Galloway x Holstein Friesian kept loose house during winter.** [Konstitutionskriterien und Aufzuchtleistung der Deutschen Rotbunten (DRB), Deutschen Schwarzbunten (DSB) und der Kreuzung Galloway x Holstein Friesian (G x HF) waehrend der Winterstallhaltung.] In: 3. Trenthorster Kolloquium, *Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry*, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. *Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung*.] FAL: Braunschweig-Voelkenrode, Germany, pp. 46-70, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: beef cattle, cows, mothers, calves, lactation, weight, weight gain, weight losses, body condition, nutritional status, winter, housing, blood composition, metabolism, testing, Germany, European Union, German language.

Stookey, J.M.; Goonewardene, L.A. (1996). **A comparison of production traits and welfare implications between horned and polled beef bulls.** *Canadian Journal of Animal Science* 76 (1): 1-5, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: beef bulls, Charolais, Hereford, breed, polled condition, horns, live weight gain, body weight, scrotum, backfat, fat, thickness, dehorning, animal welfare.

Stookey, J.M.; Watts, J.M.; Schwartzkopf, K.S. (1996). **Effects of restraint and branding on subsequent ease of movement through a chute in beef cattle.** *Journal of Animal Science* 74 (SUPPL. 1): 133, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: aversion, habituation process, hot-iron branding.

Sunandar, N.; Kusnadi, U.; Sugandi, D. (1996). **Family participation in fattening Ongole cattle with "Kereman" system.** [Penyerapan tenaga kerja keluarga petani-ternak oleh usaha penggemukan sapi Peranakan Ongole (PO) sistem kereman.] In: *Proceedings of Scientific Meeting on Animal Husbandry Research Results: Application for Small Scale Industry*. [Prosiding Temu Ilmiah Hasil-hasil Penelitian Peternakan: Aplikasi Hasil Penelitian Untuk Industri Peternakan Rakyat.] Basuno, E.; Mahyuddin, P.B.; Saepudin, Y.; Hidayat, S. (eds.), Balitnak: Bogor, Indonesia, pp. 149-158, ISBN: 979-8261-27-5.

Keywords: beef cattle fattening, family labor, farmer income, crop management, java, Indonesian Language, Indonesia.

Surmacz, F. (2000). **Intensive beef cattle breeding and husbandry with full utilization of environment conditions in Agrofirma "Witkowo" - Western-Pommeranian voivodeship.**

[Intensywny chow i hodowla bydła mięsnego z pełnym wykorzystaniem warunków przyrodniczych w Spółdzielczej Agrofarm "Witkowo".] *Annals of Warsaw Agricultural University. Animal Science* 35(Suppl.): 197-202, ISSN: 0298-5739.

Keywords: herd structure, breeding systems, husbandry, feeding, housing, fattening, cooperative activities, livestock management, Polish language, Poland.

Ting, S.T.L.; Earley, B.; Hughes, J.M.L.; Crowe, M.A. (2002). **Effect of ketoprofen, local anesthesia, and caudal epidural anesthesia during castration of beef cattle.** *Journal of Dairy Science* 85 (Supplement 1): 31, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: breed, Holstein x Friesian, bull, plasma, blood and lymphatics, acute phase proteins, cortisol, fibrinogen, interferon-gamma, ketoprofen, analgesic drug, local anesthesia, burdizzo castration, caudal epidural anesthesia, growth rate, immune function.

Ting, S.T.L.; Earley, B.; Hughes, J.M.L.; Crowe, M.A. (2002). **Effect of ketoprofen, local anesthesia, and caudal epidural anesthesia during castration of beef cattle.** *Journal of Dairy Science* 85 (Supplement 1): 31, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: breed, Holstein x Friesian, bull, plasma, blood and lymphatics, acute phase proteins, cortisol, fibrinogen, interferon-gamma, ketoprofen, analgesic drug, local anesthesia, burdizzo castration, caudal epidural anesthesia, growth rate, immune function.

Ting, S.T.L.; Earley, B.; Crowe, M.A. (2002). **Effect of time and frequency of administration of ketoprofen during surgical castration of beef cattle.** *Journal of Dairy Science* 85 (Supplement 1): 246, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: breed, Holstein x Friesian, bull, calf, male, interferon gamma, plasma, acute phase proteins, cortisol, fibrinogen, haptoglobin, ketoprofen, analgesic drug, dosage, surgical castration, surgical method, average daily feed intake, immune function.

Ungar, E.D. (2002). **BokerTov: A record-keeping and analysis program for beef herds at pasture.** *Agronomy Journal* 94 (3): 493-500, ISSN: 0002-1962.

NAL Call Number: SB1 A37.

Keywords: beef herds, BokerTov, analysis program, computer software, record-keeping program, individual animal data, pasture characteristics.

Viljoen, S. (2001). **The ABC of beef production - 1. Preparing for a severe winter.** *Farmer's Weekly* 91019: 18-19.

Keywords: cows, winter, feeding, rations, growth, stocking density, livestock management, South Africa.

Viljoen, S. (2001). **ABC of beef production - 2. Take the worry out of weaning.** *Farmer's Weekly* 91020: 24-25.

Keywords: calves, weaning, cows, weight gain, weight losses, weaning weight, South Africa.

von Boberfeld, W.O.; Woehler, K.; Erhardt, G.; Gauly, M.; Urban, C.; Seufert, H.; Wagner, A. (2002). **Perspectives of grassland utilisation in peripheral regions.**

[Nutzungsperspektiven fuer Gruenland peripherer regionen.] *Berichte ueber Landwirtschaft* 80 (3): 419-445, ISSN: 0005-9080.

NAL Call Number: 18 G31

Abstract: Decreasing numbers of dairy cows and increasing individual milk performance as a consequence of enhanced quality of basic forage and the increasing importance of concentrates caused a redundancy of grassland. It is deducible from the recent development of livestock, that in particular in peripheral regions, keeping of suckler cows and beef cattle may be interesting, irrespective of the farm size. Dominant factors for the economic success of suckler cow and beef cattle keeping are the marketing performance and costs for stables, forage, and work. This paper focuses on the analysis of the cost items. The results can be summarized as follows: Outdoor stock keeping during winter in form of winter grazing, straw folds or folds on arable land are options to save costs for stables. This system is possible to practice ecologically friendly and according to demands of animal comfort. The extension of the grazing period by a careful defoliation during the vegetation period helps to save costs for conserves, provided that the soil type of the pastures is usable and the available soils have a sufficient bearing capacity. Concerning the plant communities *Lolio-* and *Festuco-Cynosuretum*, the forage value was acceptable, depending on year. Following forage traits were analysed: energy concentration, crude protein concentration, ergosterol concentrations, and concentrations of common mycotoxines, like zearalenon and ochratoxin A. Instead of hay or straw, silage can be an excellent alternative. But measured nitrate concentrations in herbage were insufficient, irrespective of the site, which makes it necessary to use appropriate silage additives. Alternative breeding traits like behavioural traits related to temperament and traits of disease resistance are more and more of importance in beef cattle breeding. Because ease of handling is influenced by the intensity of human-animal contacts, difficulties in handling can occur under extensive management systems. Then the safety of the stockperson and the welfare of the animal are at risk, handling is more labour intensive and time consuming and therefore causes increased production costs. Genetic differences in temperament in German Angus and Simmental cattle are shown. Temperament was defined as the behavioural response of the animal to handling under different situations. German Angus and male calves in both breeds were less difficult to handle regarding the different parameters. The results were proofed at different ages. Simmental cattle have been raised under more intensive production systems than German Angus cattle in the past. Therefore they are more used to human contact. Bad temperament is more common in cattle reared in intensive systems, because under these conditions, genetically based poor temperament is masked by the intensive handling. The estimated heritabilities of the behavioural traits open a way of selection for temperament in German Angus and Simmental cattle. The process costs on the farm are very high, if they are compared with the costs of farms in the east of Germany or with intensive grassland management e.g. in "Schleswig Holstein". They are even higher if the yield in energy value is comprised to the evaluation. So the results are causal in context with high machine-costs and unfavourable field-structure on the one side and low yield because of an extensive cultivation on the other side. To reduce this high costs a cost oriented use of technique and the use of modern agricultural systems, - e.g. the use of Conditioners or automotive mowers - could be a possibility. Also a structural change effects an economy of process costs. If an enlargement of fieldsize or a reduction of the farm-field distance is to prefer, it shouldn't be evaluated separately from the aspects of transport-linked and non-transport-linked field operations as well as the investment and the degree of utilisation.

Keywords: Angus, Simmental, Schleswig Holstein, breed, extensive cultivation, extensive management system, grassland utilization, hay, feed, pasture grazing, silage, straw, temperament traits. Copyright© 2003, CAB International

Yeruham, I.; Perl, S.; Nyska, A. (1996). **Skin tumours in cattle and sheep after freeze, or heat, branding.** *Journal of Comparative Pathology* 114 (1): 101-106, ISSN: 0021-9975.

NAL Call Number: 41.8 J82

Keywords: dairy cattle, beef cattle, sheep, freeze-branding, heat-branding, tattooing with liquid nitrogen, carcinogenic epidermal neoplasia, papillomatosis, skin tumors, squamous cell carcinoma.

Legislation

Csintalan, Cs.; Visnyei, L. (1998). **Animal welfare requirements in the EU for the protection of calves and laying hens kept in battery cages.** [A borjak es a ketreces tojotyukok tartasanak allatvedelmi kovetelmenyei az EU-ban.] *Magyar Allatorvosok Lapja* 12: 753-757, ISSN: 0025-004X.

Keywords: animal welfare, calves, poultry, international agreements, directives, legislation, Protection and Human Treatment of Animals Act (1998), review, European Union, Hungarian language.

Luppi, A.; Gilioli, G. (2000). **Plans for the control of anabolic substances in beef.** [Piani di autocontrollo nella filiera delle carni bovine.] *Obiettivi e Documenti Veterinari* 21(12): 15-18, ISSN: 0392-1913.

Keywords: legislation, abattoirs, animal production, housing, feeding, anabolics, residues, slaughter, beef quality, meat quality, meat production, carcasses, Italian language, Italy.

Rossi, P.; Gastaldo, A. (2002). **Structural costs of raising beef cattle organically.** [Costo delle strutture per l'allevamento biologico dei bovini da carne.] *Informatore Agrario* 58 (2): 39-44, ISSN: 0020-0689.

NAL Call Number: 281.8 IN32.

Abstract: EC regulation 1804/99 stipulates the maximum numbers of cattle/ha in pasture and maximum numbers/m² in covered and uncovered housing for organic production. Various possibilities for meeting housing regulations (boxes with litter and outside exercise areas) for bullocks and cows are proposed and contrasted with conventional installations. The ideal solution is new buildings but, if this is not easily achieved, the farmer must analyse in detail the cost of adapting existing housing compared with building new. It is estimated that the cost of new multiple box with inclined litter facilities for housing organic beef production would be more than twice that of new conventional stalls. The costs of adapting conventional slotted floors and supplying a paved exercise area would depend on the buildings to be adapted but an average cost might well be 90 - 120 Euros. Provision for the cows and calves would cost less than for bullocks for fattening. Beef cattle are probably the most costly to provide statutory organic housing for, but against these costs must be set possible increased returns.

Keywords: beef cattle, housing, costs, boxes, litter, outside exercise areas, conventional stalls, European Union, organic farming, regulations, Italian language. Copyright© 2003, CAB International

Szabo, F.; Dohy, J.; Marton, I. (2000). **Outlook for the Hungarian beef industry in the globalising market.** [Husmarhatenyesztesunk lehetosegei globalizalodo vilagunkban.] *Allattenyesztes es Takarmanyozas* 49(6): 485-493, ISSN: 0230-1814.

Keywords: beef production, beef quality, cost benefit analysis, domestic markets, EU regulations, globalization, input output analysis, market prices, meat yield, production costs, profitability, world markets, Hungarian language, Hungary.

Production Systems and Management

Abarca, S. (1998). **Environmentally-friendly beef cattle husbandry and forests: a sustainable production alternative.** [Ganaderia de carne amiga del ambiente y los bosques: una alternativa de produccion sostenible.] *Agronomia Costarricense* 21(2): 285-297, ISSN: 0377-9424.

NAL Call Number: S15 A365

Keywords: cattle farming, forests, agroforestry systems, silvopastoral systems, atmosphere, biodiversity, deforestation, greenhouse effect, natural regeneration, organic matter, pastures, soil organic matter, sustainability, methane, carbon dioxide, Spanish language, Costa Rica.

Affandhy, L.; Winugroho, M.; Teleni, E. (2000). **Rearing of early, weaned Peranakan ongole calves under Indonesian conditions.** *Asian, Australasian Journal of Animal Sciences* 13 (Supplement Vol. B): 310, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: beef cattle production, calf rearing, early weaning, efficient production systems, live weight, locally available feeds, Indonesia.

Andersson, B. (1999). **Is it possible to be effective in two markets? [Kan man vara effektiv på två marknader?]** *Skogs- och Lantbruksakademiens Tidskrift* 138 (13): 31-36, ISSN: 0023-5350.

NAL Call Number: 104 SW3

Keywords: beef cows and sheep operation, landscape preservation, husbandry, animal production, economics, extensive farming, growth, calves, organic farming, environmental protection, Swedish language, Sweden.

Bartelletti, A.; Amorfini, A.; Zocco Pisana, L.; Genovesi, G. (1997). **A project for a sustainable development of cattle husbandry in Apuan Alps Park (Tuscany).** [Un progetto di sviluppo ecocompatibile dell'allevamento semibrado di bovini da carne nel Parco delle Alpi Apuane [Toscana.] *Zootecnica e Nutrizione Animale* 23(Suppl.5): 89-95, ISSN: 0390-0487.

NAL Call Number: SF1 Z6

Keywords: extensive husbandry, national parks, nature reserves, zootechny, highlands, breeds, development projects, germplasm conservation, ecosystems, history, pastoralism, development plans, development policies, extensive farming systems, Italian language, Italy.

Behnke, R.; Abel, N. (1996). **Intensification or overstocking: When are there too many animals?** *World Animal Review (Multilingual Edition)* 87 (2): 4-9, ISSN: 1014-6954.

NAL Call Number: SF191 W62

Keywords: beef production, intensification, mathematical model, overstocking, stocking rate, profit, rangeland degradation, environmental costs, soil loss rate, Africa

Behnke, R.; Abel, N. (1996). **Revisited: the overstocking controversy in semi-arid Africa. 1. Intensification or overstocking: when are there too many animals?** *World Animal Review (Multilingual Edition)* 87: 2-9, ISSN: 1014-6954.

NAL Call Number: SF191 W62

Keywords: arid zones, sustainability, grazing, stocking density, evaluation, husbandry practices, Africa.

Bittermann, A.; Paller, F. (1998). **Results and consequences of the assessment of the beef cattle farm branch in 1996.** [Ergebnisse und Konsequenzen aus der Betriebszweigauswertung Rindermast 1997.] *Forderungsdienst* 46 (5): 21-32, ISSN:0015-525X.

NAL Call Number: 19 F75

Keywords: beef cattle, producer prices, production, bovine spongiform encephalopathy, production costs, animal husbandry, farm surveys, farm comparisons, profitability, calf prices, fattened animal prices, breed data, feed ration, daily weight gain, length of feeding period, German language, Austria.

Boyd, N.; Fredeen, A.; Martin, R. (1998). **To rotate beef cattle more or less frequently: That is the question.** *Canadian Journal of Plant Science* 78 (2): 315-316, ISSN: 0008-4220.

NAL Call Number: 450 C16

Keywords: rotation grazing, forage crops, weight gain, Canada.

Bruce, L.B.; Torell, R.C.; Hussein, H.S (1999). **Profit prediction in cow/calf operations. 1. CowCost software program.** *Journal of Production Agriculture* 12(4): 644-647.

NAL Call Number: S539.5 J68.

Abstract: Management and marketing are key components of success and profitability of any beef cow/calf operation. There are many factors involved in management of a cow/calf operation and in marketing its products. These factors interact in a complex manner making any attempt to separate their effects, when predicting profitability as a function of management and marketing decisions, difficult and impractical. Therefore, we developed a simple computer program (CowCost, runs under Windows95 or Windows98) to enable producers to evaluate various management practices and their potential impacts on profitability. The program links the management and marketing variables commonly found in a cow/calf operation in an interactive way. This results in an immediate response to any changes in the input data and, therefore, provides the users with the ability to test many "what if" scenarios and their subsequent effects on profitability. In turn, producers can check many different scenarios, prices, costs, and how they will affect the value of a cow. It is both a program to evaluate management ideas and profit potential of chosen scenarios. The program considers money borrowed to buy a cow, duration of the loan, cost of the cow, salvage value of the cow, yearly cow cost, calf weaning weight, calf price per pound and other variables to evaluate profit potential. Varying any one of these gives insight to management practices that could be emphasized to increase profit. The program allows investigation of the effects of costs relative to other inputs in decisions about purchasing cows.

Keywords: beef cows, beef cattle, calves, profits, prediction, computer software, computer techniques, profitability, marketing, decision making, prices, costs, economic analysis, evaluation, cattle husbandry.

Bruce, L.B.; Torell, R.C.; Hussein, H.S. (1999). **Profit prediction in cow/calf operations. 2. Influence of major management practices.** *Journal of Production Agriculture* 12(4): 647-649.

NAL Call Number: S539.5 J68.

Abstract: Determining which management practices to focus on to improve profitability is a major challenge in any cow/calf operation. We used CowCost management simulation to evaluate the relative importance the major factors. The software generated 50 000 different management scenarios using values that were generated randomly, but within reasonable ranges of typical western cow/calf operations. Management factors studied by the model included the original cost of the cow, interest rate paid on money borrowed to buy the cow,

salvage value of the cow at the end of her production life, percentage of calves the cow might wean, yearly cost per cow of the ranching operation, average weaning weight of the calf, and the average price brought by the calf. The model assumes calves will be sold at weaning and not held as yearlings. The model used these management factors to predict profit or loss, and to gauge the relative importance of the management practice. All scenarios were for one cow with an assumed production of 8 yr. Correlation analysis of the data showed that yearly cost was the most influential in determining profit or loss. The money received per pound of calf was next most influential. Weaning weight was the third most influential and weaning percent is fourth. The original cost of the cow, interest rates, and salvage value of the cow were far less influential on profit loss. While these final items, especially the cost of the cow and interest rate, receive a great deal of attention from most producers, they may not deserve that much attention, especially compared with other management inputs.

Keywords: beef cows, beef cattle, calves, profits, prediction, computer software, computer techniques, profitability, marketing, decision making, prices, costs, economic analysis, cattle husbandry, evaluation, software.

Butterly, J. (2000). *The Production and Marketing of Beef* Nuffield Farming Scholarships Trust (NFST): Uckfield, UK, 19p., ISBN: 1-901801-18-7.

Keywords: beef, production, marketing, exports, quality, beef cattle, animal husbandry, animal breeding, meat and livestock industry, Irish Republic.

Cardoso, E.G. (1996). **Fattening cattle in feedlots. General aspects. [Engorda de bovinos em confinamento. Aspectos gerais.]** *Documentos - Centro Nacional de Pesquisa de Gado de Corte o.* (No. 64), Centro Nacional de Pesquisa de Gado de Corte (CNPGC) (EMBRAPA): Campo Grande, Brazil, 36p., ISSN: 0100-9443.

NAL Call Number: SF 196.B7D63

Keywords: nutrition, construction of feedlots, fattening performance, meat production, health, husbandry, economics, management, feedlots, growth, tropics, reviews, Portuguese language, Brazil.

Casasus, I.; Sanz, A.; Villalba, D.; Ferrer, R.; Revilla, R. (2002). **Factors affecting animal performance during the grazing season in a mountain cattle production system.** *Journal of Animal Science* 80 (6):1638-1651, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breed, Brown Swiss, Pirenaica, animal performance, calving season, grazing season, production system, mountain pastures, Spain.

Cezar, I.M.; Euclides Filho, K. (1996). **Intensive fattening of steers: reflections on the efficiency and profitability of production systems. [Novilho precoce: reflexos na eficiencia e economicidade do sistema de producao.]** *Documentos - Centro Nacional de Pesquisa de Gado de Corte o.* (No. 66), Centro Nacional de Pesquisa de Gado de Corte (CNPGC) (EMBRAPA): Campo Grande, Brazil, No. 66, 31p., ISSN: 0100-9443.

NAL Call Number: SF196.B7D63

Keywords: steers, nutrition, feed supplements, feedlots, weaning weight, selection, profitability, meat production, management, age at first calving, tropics, growth, beef production, intensive husbandry, economics, Portuguese language, Brazil.

Cino, D.M.; Castillo, E. (1999). **A note on costs and benefits of rotational cattle fattening systems with leucaena (*Leucaena leucocephala*) under non-irrigation conditions.** *Cuban Journal of Agricultural Science* 33(4): 339-342, ISSN: 0864-0408.

Keywords: agroforestry systems, beef production, husbandry, cost benefit analysis, finishing, grasslands, grazing systems, live weight, natural grasslands, paddocks, production costs, profits, rotational grazing, silvopastoral systems, *Leucaena leucocephala*, Cuba.

Coates, D.B.; Miller, C.P.; Hendricksen, R.E.; Jones, R.J. (1997). **Stability and productivity of *Stylosanthes* pastures in Australia. II. Animal production from *Stylosanthes* pastures.** *Tropical Grasslands* 31 (5): 494-502, ISSN: 0049-4763.

NAL Call Number: SB197 A1T7

Keywords: native pasture, *Stylosanthes*, forage crop forage, grazing intensity, pasture productivity, pasture stability, live weight gain, Australia.

Coleou, J. (2000). **The productions of ruminants: prospects and questioning.** *Comptes Rendus de l'Academie d'Agriculture de France* 86(4): 147-161, ISSN: 0989-6988.

NAL Call Number: S5 C65

Keywords: ruminants, animal production, dairy cattle, beef cattle, productivity, beef, veal, consumer behavior, world markets, economic competition, France, animal products, French language, Western Europe.

Colson, F.; Chatellier, V. (1996). **French suckler farms are among the most extensive in the European Community. [Les exploitations bovines francaises sont parmi les plus extensives de l' Union europeenne.]** *Productions Animales* 9(4): 273-284, ISSN: 0990-0632.

Keywords: beef cattle, dairy cattle, farm size, stocking density, economic analysis, farm results, profitability, intensive husbandry, extensive husbandry, international agreements, European Union, French language.

Dedieu, B.; Chabanet, G.; Josien, E.; Becherel, F. (1997). **Grazing management and labour constraints: methods of investigation and examples taken from beef cattle farms.**

[Organisation du paturage et situations contraignantes en travail: demarche d'etude et exemples en élevage bovin viande.] *Fourrages* (149): 21-36, ISSN: 0429-2766.

NAL Call Number: 60.8 F82

Keywords: methodology, beef production, labour, beef cattle, grazing, management, constraints, farms, French language, France.

Degroff, T.J. (1996). **Critical thinking as an approach to problem solving for cow/calf production management.** *Agri-Practice* 17 (3-4): 18-23, ISSN: 0745-452X.

NAL Call Number: SF601 B6

Keywords: artificial insemination, cattle breeding, economics, food animal veterinarians, herd sizes.

Dobicki, A. (2000). **Systems of beef cattle husbandry in Poland. [Systemy chowu bydla miesnego w Polsce.]** *Annals of Warsaw Agricultural University, Animal Science* (Supplement 35): 27-39, ISSN: 0208-5739.

Keywords: animal husbandry, beef cattle, reviews, Polish language, Poland.

Dobicki, A. (1996). **Models of beef cattle production in conditions of Jelenia Gora Valley. [Modele produkcji bydla miesnego w warunkach Kotliny Jeleniogorskiej.]** *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 291: 77-89, ISSN: 1232-3071.

Keywords: cows, heifers, beef cattle breeds, crossbreeding, small, Angus, Hereford, medium, Limousin, Blonde d'Aquitane, large, Charolaise, meat production, models, body weight, calving season, Poland, Polish language.

Donkersgoed, J. van, Grogan, H.; Jim, K.; Hunt, T.D.; Moss, E.W.; Warrack, J.; Myers, D. (1996). **Good production practices in the feedlot: Canadian Cattlemen - Quality Starts Here, a new national programme.** *Canadian Veterinary Journal* 37 (9): 535-538, ISSN: 0008-5286.

NAL Call Number: 41.8 R3224.

Keywords: husbandry, production, health, programs, Canada.

Fisher, M. (2003). **Welfare aspects of intensive grazing systems for beef production.** *Surveillance* 30(1):19-20, ISSN: 0112-4927.

NAL Call Number: SF604.63 N45S87

Keywords: health, animal welfare, beef cattle, production, grazing systems, intensive livestock farming, New Zealand.

Frank, B.R.. (1997). **Adoption of innovations in the north Queensland beef industry. III: implications for extension management.** *Agricultural Systems* 55 (3): 347-358, ISSN: 0308-521X.

NAL Call Number: HD1 A3

Keywords: beef cattle, modernization, farmers' attitudes, profitability, lifestyle, environmental impact, farm management, economic behavior, social values, cattle farming, innovation adoption, extension, Queensland, Australia.

Fuchs, C. (2001). **Economic efficiency of intensive and extensive animal husbandry. [Okonomischer Nutzen von extensiver und intensiver Tierproduktion.]** *Praktische Tierarzt* 82 (8): 578-585, ISSN: 0032-681X.

NAL Call Number: 41.8 P882

Keywords: public opinion, agricultural economics, animal welfare standards, beef cattle, dairy cattle, pigs, climate, grazing, intensive husbandry systems versus extensive systems, housing, straw, labor costs, research, German language.

Giorgetti, A.; Rondina, D.; Sargentini, C.; Martini, A.; Funghi, R.; Bozzi, R.; Innocenti, E.; Negrini, R.; Biffani, S. (1996). **The production of meat by organic livestock systems in Tuscany (beef cattle). [La produzione di carne con metodo biologico in Toscana (bovini da carne).]** *Bioagricoltura* 6(39): 41-49.

Keywords: veal calves, organic agriculture, meat production, livestock management, slaughter weight, dressing percentage, carcass composition, quality, animal feeding, alternatives, farming systems, Italy, Italian language.

Gutman, M.; Henkin, Z.; Holzer, Z.; Noy-Meir, I.; Seligman, N.G. (2000). **A case study of beef-cattle grazing in a Mediterranean-type woodland.** *Agroforestry Systems an International Journal* 48(2): 119-140.

NAL Call Number: SD387 M8A3.

Keywords: beef cattle, Mediterranean climate, grazing, case studies, garrigue, feed supplements, shrubs, thinning, cows, stocking rate, poultry manure, weaning weight, calves,

calving season, seasonal variation, husbandry, performance, landscape, regrowth, sustainability, Israel.

Haurez, P. (1996). **Desintensification of the forage system for suckling cows in Vendee (France).** [Desintensification du systeme fourrager pour vaches allaitantes en Vendee.] In: *Proceedings of the 3. meeting "Rencontres autour des recherches sur les ruminants"*. Paris (France), December 4 and 5 1996. [3. Rencontres autour des recherches sur les ruminants. Paris (France), les 4 et 5 decembre 1996.] Institut de l' Elevage: Paris, France, p. 108, ISBN: 2-84148-022-4.

Keywords: cows, extensification, grazing, livestock management, grassland management, animal performance, animal feeding, behavior, extensive farming, France, French language.

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NAL Call Number: 49 J82.

Keywords: beef cattle management systems, spring calving, fall calving, overview of structure and function of ecosystems, energy input/output, whole body mass, grain production budgets, raw materials, manufacturing, distribution costs.

Ingrand, S.; Carrasco, I.; Devun, J.; Laroche, J.M.; Dedieu, B. (2001). **The diversity of livestock management practices in specialist beef farms involved in the certified quality meat sector.** [L' implication des eleveurs de bovins viande dans les filieres de qualite correspond-elle a des conduites d' elevage specifiques?] *Productions Animales (Paris)* 14 (2): 105-118, ISSN: 0990-0632.

NAL Call Number: SF1.P77

Keywords: breed, Charolais, female, farmers, farm management priorities, beef production, certified quality meat sector, management practices French language.

Izquierdo Cebrian, M.; Martin Bellido, M.; Hernandez Garcia, F.I.; Garcia Torres, S.; Espejo Diaz, M. (1999). **Potential of beef cattle in Extremadura (Spain).** [El potencial de vacuno de carne en (Extremadura).] *Agricultura* 798: 32-35, ISSN: 0002-1334.

Keywords: animal production, carcasses, beef, quality, land races, animal husbandry methods, Spanish language, Spain.

Julien, D.J.; Tess, M.W. (2002). **Effects of breeding date, weaning date, and grazing season length on profitability of cow-calf production systems in southeastern Montana.** *Journal of Animal Science* 80 (6): 1462-1469, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breeding, breeding date, cow-calf production system profitability, cow-calf production systems, grazing season length, profits, weaning, weaning date.

Kiley-Worthington, M.; Randle, H.D. (1999). **The criteria for ethologically and ecologically raised beef.** *Biological Agriculture and Horticulture* 16 (4): 369-380, ISSN: 0144-8765.

NAL Call Number: S605.5 B5.

Abstract: The problems of beef production, including concerns about animal welfare, undesirable environmental effects, inability to be economically viable without subsidies from the public purse, and, recently, in the light of the B.S.E. crisis, possible concern for public health, are discussed. The criteria for improved animal welfare, including reduced behavioural restriction, are examined in order to work towards developing "ethologically sound" environments. The criteria for assessing the ecological effect of the beef producing enterprise

are also outlined. One suggested way of reducing environmental and animal welfare problems is the production of suckled beef on ecological farms if this can be economic.

Keywords: beef production, animal welfare, behavioral restriction, bovine spongiform encephalopathy, public health concerns, profitability, environmental impact, animal husbandry, meat production, UK. Copyright© 2003, CAB International

Kiley-Worthington, M.; Randle, H.D. (1999). **The practicalities and economics of ethologically and ecologically raised double suckled beef.** *Biological Agriculture and Horticulture* 16(4): 381-393, ISSN: 0144-8765.

NAL Call Number: S605.5 B5.

Abstract: This paper describes an ethological and ecological management system for rearing beef cattle. Data on the management, production and economic performance of a herd of double-suckled South Devon cattle on a farm within the Dartmoor National Park, UK, were collected from 1990 to 1996 and were compared to figures given in the University of Exeter's Farm Management Handbook for Premium Farms. Data from the experimental farm included records on 62 cows which gave birth to 60 calves and reared an additional 53 calves. The ecological criteria were mainly fulfilled by the management system and the gross margin per head (pounds sterling 158.90-818.18) was generally higher than that of the conventional farms (pounds sterling 366.10-555.34).

Keywords: South Devon, breed, animal welfare, animal behavior, husbandry, prices, suckling, farm management, beef production, profitability, economics, suckler herds, farming systems, organic farming, UK. Copyright© 2003, CAB International

Laws, J.A.; Pain, B.F.; Jarvis, S.C.; Scholefield, D. (2000). **Comparison of grassland management systems for beef cattle using self-contained farmlets: effects of contrasting nitrogen inputs and management strategies on nitrogen budgets, and herbage and animal production using self-contained farmlets: effects of contrasting nitrogen inputs and management strategies on nitrogen budgets, and herbage and animal production.** *Agriculture, Ecosystems and Environment* 80(3): 243-254.

NAL Call Number: S601 A34.

Keywords: grassland management, farming systems, farms, nitrogen, application rates, nitrogen balance, herbage, biomass production, grazing, animal husbandry, cutting, nutrient sources, broadcasting, cattle slurry, animal housing, *trifolium repens*, grass sward, botanical composition, soil injection, sandy loam soils, silage, sustainability, fodder, ammonium nitrate, South West England.

Levantin, D.L. (1996). **Developing beef cattle husbandry.** *Zootekhniya* (7): 22-26, ISSN: 0235-2478.

NAL Call Number: SF1.Z66

Keywords: cattle farming, beef, breeds, animal breeding, livestock numbers, animal production, production, milk, imports, beef cattle, specialization, production possibilities, development programs, natural grasslands, agricultural policy, Russian language, Russia.

Lopes, M.A.; Vieira, P.F. (1998). **Proposal of new equivalent values for different animal categories to quantify cattle herds and adjust stocking rates. [Proposta de novos valores de equivalencia entre as categorias animais para dimensionar rebanhos bovinos e ajustar a lotacao das pastagens.]** *Arquivo Brasileiro de Medicina Veterinaria e Zootecnia* 50 (6): 759-763, ISSN: 0102-0935.

NAL Call Number: SF604.A76

Keywords: dairy cattle, beef cattle, stocking rate, animal husbandry, breed size, body weight, age at first parturition, estimation, age at slaughter, Portuguese language.

Marcelo Tima, P.; Guillermo Wells, M.; Fernando Borquez, L.; Marcos Figueroa, R.; Ricardo, P. (2000). **Beef production system with Holstein Friesian steers born in autumn.** [Sistema de produccion de carne con novillos Holstein Friesian nacidos en otono.] *Agro-Ciencia*, *Ene* 16(1): 47-53, ISSN: 0716-1689.

NAL Call Number: S15 A377.

Keywords: Holstein Friesian, breed, parturition, intensive husbandry, fattening, grazing, restraint of animals, carcasses, feeding, farming systems, reproduction, Chile, Spanish language.

Martin, S.; Seeland, G. (1999). **Effects of specialisation in cattle production on ecologically harmful emissions.** *Livestock Production Science* 61(2-3): 171-178, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: dairy cattle, beef cattle, genetic gain, animal husbandry methods, meat production, milk production, pollution by agriculture, nitrogen, phosphorus, methane.

McCrabb, G.J.; Hunter, R.A. (1999). **Prediction of methane emissions from beef cattle in tropical production systems.** *Australian Journal of Agricultural Research* 50 (8): 1335-1339, ISSN: 0004-9409.

NAL Call Number: 23 Au783.

Keywords: Brahman, breed, methane emissions, pollution, predictive equations, tropical forage diets, high grain diet.

Mesini, A. (1996). **The Europe in comparison (beef cattle husbandry).** [L' Europa a confronto (allevamento di bovini da carne).] *Informatore Zootecnico* 53(10): 31-32, ISSN: 0020-0778.

NAL Call Number: 49 IN3.

Keywords: beef cattle, calves, veal, production data, husbandry, feeding, Italy, Italian language.

Moerchen, F.M. (1997). **Management of suckler cow herds in winter outdoor husbandry.** [Anforderungen an das Management der Mutterkuhhaltung bei Winterfreilandhaltung.] In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. *Studies on Appropriate and Environmentally Friendly Animal Husbandry*, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. *Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung*.] FAL: Braunschweig-Voelkenrode, Germany, pp. 224-230, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

Keywords: beef cattle cows, mothers, animal husbandry, animal feeding, winter pastures, site factors, nutritional requirements, costs, soil types, management, Germany, European Union, German language.

Morrow, R.E.; Wells, C.A.; Onks, D.O.; Martz, F.A.; Gerrish, J.R.; Beetz, A.; Sullivan, P.; West, C.P. (1998). **Teaching sustainable beef cattle management workshops.** *Journal of Animal Science* 76 (SUPPL. 2): 8, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cattle, management, workshops, information, teaching, textbooks, audio, visual aids.

Nasirov, U. (1996). **Animal husbandry system, its status and development problems in Uzbekistan.** *Dryland Pasture, Forage and Range Network News* (12): 12-13.

Keywords: beef cattle, sheep, goats, breeding, livestock farming, production, history, efficiency, new feed resources, supply, pastures, lucern, maize Uzbekistan, West Asia.

Okularczyk, S.; Novak, T.; Sowula, E. (1996). **Cows and beef cattle handling costs with different production scale and mechanization levels.** [Koszty obsługi krow i bydła opasowego w różnej skali produkcji i przy różnych poziomach mechanizacji pracy.] *Zeszyty Naukowe Akademii Rolniczej we Wrocławiu. Konferencje* 291: 269-273, ISSN: 1232-3071.

Keywords: beef cattle cows, farm management, mechanization, production costs, farm equipment, feeding equipment, livestock numbers, business management, labor costs, Poland, Polish language.

Pang, H.; Makarechian, M.H.; Basarab, J.A. (1999). **A simulation study on the effects of cow size and milk production on bioeconomic efficiency of range beef cattle.** *Journal of Applied Animal Research* 16 (2): 119-128, ISSN: 0971-2119.

NAL Call Number: SF55 I4J68.

Keywords: simulation model, Alberta Beef Production Simulation System (ABPSS), effects of, cow size, milk production, calf market price, economics, calf market price, weaning age, dry matter intake.

Pang, H.; Makarechian, M.; Basarab, J.A.; Berg, R.T. (1999). **Structure of a dynamic simulation model for beef cattle production systems.** *Canadian Journal of Animal Science* 79(4): 409-417.

NAL Call Number: 41.8 C163.

Abstract: A dynamic deterministic model for simulating beef cattle production systems is developed to evaluate the effects of production traits and management strategies on the bioeconomic efficiency of beef production systems. The model, named Alberta Beef Production Simulation System (ABPSS), is composed of four major submodels: herd inventory, nutrient requirement, forage production, and economic submodels. The herd inventory submodel is used to simulate population dynamics and feed requirements in the herd. The nutrient requirements submodel is mainly based on the 1996 version of the National Research Council (NRC). It is used to evaluate nutrients and feed requirements for calves and cows depending on their physiological status (maintenance, growth, lactation and gestation) and the climatic condition. The forage production sub-model is used to predict forage growth rate, cattle grazing rate, available forage biomass and total hectares required for grazing. The economic submodel measures bioeconomic efficiency, as net return per cow, by subtracting total cost from total return. The nutrient requirements predicted by ABPSS were compared with those recommended by the NRC for testing. The results that were predicted by the NRC model and ABPSS model were similar, as expected. Sensitivity analyses showed that cow mature weight, milk production, calf weaning weight and feed prices were the most critical input parameters in the model. It must be noted that the model was developed based on available experimental results and data from the literature and, due to the unavailability of a suitable data set, the model could not be validated. We suggest that the ABPSS has the

potential for providing a use method for simultaneous consideration of many factors in an integrated system, which could be helpful to beef cattle extension specialists and cow-calf production managers for assessing the potential effects of different management and selection strategies on bioeconomic efficiency.

Keywords: beef cows, calves, calf production, dynamic models, simulation models, mathematics and statistics, nutrient requirements, returns, cattle husbandry.

Pang, H.; Basarab, J.A.; Makarechian, M.; Hudson, R.J.; Price, M.A.; Berg, R.T. (1997). **A simulation model for beef cattle production systems.** *Canadian Journal of Animal Science* 77 (3): 572-573, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: beef calves, energy, cow size, economics, forage production, herd dynamics, management strategies, production traits, protein requirements, simulation systems, Stellar I software.

Phillip, L.E.; Goldsmith, P.; Bergeron, M.; Peterson, P.R. (2001). **Optimizing pasture management for cow-calf production: the roles of rotational frequency and stocking rate in the context of system efficiency.** *Canadian Journal of Animal Science* 81(1): 47-56, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: animal production, spring-calving cows, calves, crude protein, economics, efficiency, grassland management, grasslands, intensive husbandry, live weight gain, rotational grazing, stocking rate.

Rahim, L.; Harada, H.; Fukuhara, R. (1996). **Estimating body weight by use of body measurements of fattening Japanese Black beef steers.** *Animal Science and Technology* 67 (2): 115-119, ISSN: 0918-2365.

NAL Call Number: 49 N62.

Keywords: steers, Japanese Black, breed, body measurements, chest girth, body length, hip height, thurl width, regression analysis.

Rodriguez Castanon, A.A.; Alfageme Beovide, L.A. (1996). **Technical and economic characters of beef cattle production systems in Asturias. [Características tecnico-económicas de los sistemas productivos de carne vacuna del principado de Asturias.]** *ITEA Produccion Animal* 92A (2): 77-91, ISSN: 1130-6009.

NAL Call Number: S15 I8

Keywords: beef cattle, grazing, extensive husbandry, profitability, extensive livestock farming, management, meat production, extensive production versus intensive production, economics, Spanish language, Spain.

Salvadori, F.; Pistoia, A. (1997). **Livestock rearing experience into the Park of Migliarino - San Rossore - Massaciuccoli (Tuscany). [Esperienza di allevamento di bovini da carne nel Parco di Migliarino - San Rossore - Massaciuccoli (Toscana).]** *Zootecnica e Nutrizione Animale* 23(Suppl. 5): 119-122, ISSN: 0390-0487.

NAL Call Number: SF1 Z6

Keywords: national parks, nature reserves, animal husbandry, zootechny, regulations, farms, Italian language, Tuscany, Italy.

Sanchez, M.E.; Garcia, F.P.(2000). **Some characteristics of extensive animal production in the south-west of Spain.** [Características de la producción animal extensiva en el suroeste español.] *Avances en Alimentación y Mejora Animal* 40 (6): 3-11, ISSN: 0005-1986.

NAL Call Number: SF95 A9

Keywords: livestock, beef cattle, sheep, pigs, goats, indigenous breeds, husbandry, age, stocking density, growth, body weight, slaughter weight, milk production, meat production, wool production, reproductive performance, Spanish language, Spain.

Sheath, G.W.; Webby, R.W.; Keeling, P.; Thomson, R.D.; Page, C.R.; Burton, G.T. (1999). **The results and success factors of nine group farm monitoring programmes.** *Proceedings of the New Zealand Society of Animal Production* 59: 87- 90, ISSN: 0370-2731.

NAL Call Number: 49.9 N483.

Keywords: beef cattle, sheep, farm monitoring, farm management, performance , income, technology, product information, supply, demand. New Zealand.

Teslik, V. (2001). **Management of beef cattle herds.** *Zemедelske Informace* (No.18) Ustav Zemедelskych a Potravinarskych Informaci: Praha, Czech Republic, 56 pp., ISBN: 80-7271-187-7.

Keywords: Czech language, Czech Republic, bulletin, management practices, agricultural economics, winter housing, beef production, carcass grading, cattle breed characteristics, mineral nutrition, mineral supplements.

Tess, M.W.; Kolstad, B.W. (2000). **Simulation of cow-calf production systems in a range environment: I. Model development.** *Journal of Animal Science* 78 (5): 1159-1169, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: computer simulation of beef cattle production systems, body composition, cows, genotypes, lactation, metabolism, prices, protein metabolism, reproduction, beef production, calf production, animal production, simulation models, Montana.

Vavra, M. (1996). **Sustainability of animal production systems: an ecological perspective.** *Journal of Animal Science* 74(6):1418-23, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: current systems, non-sustainable, resource extraction, constructive change, quantitative measure, research and extension personnel, adaptive management strategies, interdisciplinary efforts, legislation, American Society of Animal Science (ASAS), strategic planning, current issues, environmental concerns.

Velde, K. vander (1996). **Ecology of beef production.** *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 291: 31-38, ISSN: 1232-3071.

Keywords: grassland management, grazing systems, water management, environmental impact, benefits of raising cattle, organic wastes, waste management, environmental protection, ecology, pollution control, USA.

Wade, T.G.; Schultz, B.W.; Wickham, J.D.; Bradford, D.F. (1998). **Modeling the potential spatial distribution of beef cattle grazing using a Geographic Information System.** *Journal of Arid Environments* 38 (2): 325-334, ISSN: 0140-1963.

NAL Call Number: QH541.5 D4J6

Keywords: arid environment, geographic information system, based models, land management, potential spatial distribution models, variables, vegetation type, degree of slope, distance from water.

Wahyono, D.E.; Affandhy, L.(1996). **Economic analysis of fattening Madura cattle and its contribution to farmers income in dryland area.** [Kajian ekonomis penggemukan sapi Madura jantan dan kontribusinya terhadap pendapatan petani di lahan kering : studi kasus di Desa Ranu Agung Kecamatan Tiris Kabupaten Probolinggo.] In: *Proceedings of scientific meeting on animal husbandry research results: application for small scale industry. [Prosiding temu ilmiah hasil-hasil penelitian peternakan: aplikasi hasil penelitian untuk industri peternakan rakyat.]* Basuno, E.; Mahyuddin, P.B.; Saepudin, Y.; Hidayat, S. (eds.), Balitnak: Bogor, Indonesia, pp. 131-138, ISBN: 979-8261-27-5.

Keywords: fattening, farm income, economic analysis, dry farming, java, animal feeding, cultural methods, farm surveys, farmer interviews, income, Indonesian Language, Indonesia.

Weghe, H. van den (1996). **Animal friendly livestock keeping and reducing environmentally relevant emissions - a conflict?** [Tiergerechte Nutztierhaltung und Minderung der umweltrelevanten Emissionen - ein Konflikt?] *KTBL-Arbeitspapier* 233: 209-212, ISSN: 0930-0295.

Keywords: pigs, beef cattle, poultry, ammonia, emission, pollution, livestock farming, environmental impact, welfare, German language, Germany.

Williams, C.B.; Jenkins, T.G. (1998). **A computer model to predict composition of empty body weight changes in cattle at all stages of maturity.** *Journal of Animal Science* 76 (4): 980-987, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: body composition, prediction models, computer growth model, empty body weight, fat composition.

Zizlavsky, J.; Horak, F.; Zizlavska, S. (1996). **Rearing beef cattle in lowland regions on joint pastures with sheep.** *Zeszyty Naukowe Akademii Rolniczej we Wroclawiu. Konferencje* 291: 53-62, ISSN: 1232-3071.

Keywords: beef cattle, sheep, mixed grazing systems, stocking density, weight gain, growth rate, farm inputs, livestock management, Czech Republic.

Reproduction

Baca Fuentes, J.R.; Perez Gutierrez, E.; Galina Hidalgo, C.S. (1998) **Reproductive performance of Bos taurus x Bos indicus heifers following artificial insemination after spontaneous estrus in the dry tropics of Costa Rica. [Comportamiento reproductivo de novillas Bos taurus x Bos indicus inseminadas artificialmente a estro natural en el tropico seco de Costa Rica.]** *Veterinaria Mexico* 29(1): 57-66, ISSN: 0301-5092.

NAL Call Number: SF604.V485

Keywords: heifers, crossbreeding, bos taurus x bos indicus, artificial insemination, estrus detection, reproductive performance, Spanish language, Costa Rica.

Bailey, J.D.; Rhinehart, J.D.; Anderson, L.H.; Schillo, K.K. (2002). **Repeated exposure to novel females enhances sexual behavior of bulls.** *Journal of Dairy Science* 85 (Supplement 1): 201, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: estradiol cypionate, diestrus, estrus, intromission, mounting, novel female exposure, sexual behavior.

Baker, D.S.; Engle, T.E.; Whittier, J.C.; Burns, P.D.; Mortimer, R.G.; Schutz, D.N.; Enns, M. (2002). **Trace mineral impact on reproductive performance, immune response and calf performance in grazing beef cattle.** *Journal of Animal Science* 80 (Supplement 2):117, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: calf, crossbred beef cow, female, heifer, liver, IgG, dietary supplement, copper, manganese, zinc, humoral immune response, reproductive performance.

Bellin, M.E.; Oyarzo, J.N.; Hawkins, H.E.; Zhang, H.M.; Smith, R.G.; Forrest, D.W.; Sprott, L.R.; Ax, R.L. (1998). **Fertility-associated antigen on bull sperm indicates fertility potential.** *Journal of Animal Science* 76(8): 2032-2039, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: bulls, Santa Gertrudis, breed, male fertility, 30-kDa heparin-binding protein, fertility-associated antigen, spermatozoa, membranes, sexual behavior.

Blume, H.; Segundo, J.M. (2001). **Reproductive behavior of beef cattle in Maranhao state. [Comportamento reproductivo de bovinos de corte no Maranhao.]** *Revista Brasileira de Reproducao Animal* 25(2): 125-127, ISSN: 0102-0803.

NAL Call Number: QP251 R48

Keywords: Nelore or Nelore crossed animals, extensive system, Brachiaria brizanthec and humidicola, Andropogan gayanus and Lageado (*Hyparrhnea rufa*), artificial pastures, conception rate, parturition, pasture, reproductive behavior, weaning age, Brazil, Portuguese language.

Burke, J.M.; Spiers, D.E.; Kojima, F.N.; Perry, G.A.; Salfen, B.E.; et al. (2001). **Interaction of endophyte-infected fescue and heat stress on ovarian function in the beef heifer.** *Biology of Reproduction* 65(1): 260-268.

NAL Call Number: QL876 B5.

Keywords: heifers, graafian follicles, corpus luteum, estrous cycle, synchronized females, *festuca arundinacea*, seed contamination, endophytes, mycotoxinoses, heat stress, interactions, blood serum, prolactin, cholesterol, progesterone, estradiol, fescue toxicosis.

Burnham, D.L.; Morris, S.T.; Purchas, R.W.; McCutcheon, S.N. (1997). **Effect of Compudose and Rumensin, alone or in combination, on the growth, and carcass and meat quality of steers finished on pasture.** *New Zealand Journal of Agricultural Research* 40 (2): 231-238, ISSN: 0028-8233.

NAL Call Number: 23 N4892.

Keywords: compudose, rumensin, monensin sodium, estradiol, 17 beta, feed additives, hormonal growth promotant, live weight gain, effects on, carcass quality, meat quality, m. longissimus, meat brightness, warner, bratzler peak shear value, New Zealand.

Cannell, R.C.; Belk, K.E.; Tatum, J.D.; Wise, J.W.; Chapman, P.L.; Scanga, J.A.; Smith, G.C. (2002). **Online evaluation of a commercial video image analysis system (Computer Vision System) to predict beef carcass red meat yield and for augmenting the assignment of USDA yield grades.** *Journal of Animal Science* 80 (5):1195-1201, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Computer Vision System, commercial video image, analysis system, evaluation method, online evaluation, USDA yield grades, carcass red meat yield.

Casass, I.; Sanz, A.; Bernu s, A.; Ferrer, R.; Revilla, R. (2001). **Weight change and energy supply of pasture in suckler cows under mountain conditions: effect of calving season.** [Variaci n de peso y aporte energ tico del pasto en vacas de cr a en condiciones de monta a: efecto de la poca de parto.] *Investigacion Agraria. Produccion y Sanidad Animales* 16(1): 109-125, ISSN: 0213-5035.

NAL Call Number: SF15 S7 A52 .

Keywords: suckler cows, beef cattle, parturition, grazing, body weight, livestock management, animal feeding, reproduction.

Charmley, E.; Wichtel, J.; Richardson, G.; Lofstedt, R. (2002). **The interaction between plane of nutrition and success of estrus synchronization using two methods.** *Journal of Dairy Science* 85 (Supplement 1): 206, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: gonadotropin releasing hormone, fertilitydrug, estradiol benzoate, intramuscular administration, progesterone, intravaginal device, drug delivery system, fertility drug, breeding method, estrus synchronization, Ovsynch, body weight, energy nutrition, estrus success, plane of nutrition correlation, parity, silage, animal feed, winter calving.

Chenoweth, P.J.; Vargas, C.A.; Rae, D.O.; Saltman, R.L.; Genho, P.C.; Crosby, G. (1997). **Effects of an oral antibiotic on fertility traits in range beef cows in Florida.** *Journal of Animal Science* 75 (SUPPL. 1): 249, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Simmental x Brahman, Angus x Brahman, Hereford x Brahman, crossbred cows, chlortetracycline, antibiotic, fertility traits, oral antibiotic effects.

Correa, E.S.; de Andrade, P.; Euclides, F.K.; Alves, R.G. (2000). **Evaluation of a Beef Cattle production system. 1. Reproductive performance.** [Avaliacao de um Sistema de Producao de Gado de Corte. 1. Desempenho Reprodutivo.] *Revista Brasileira de Zootecnia* 29 (6 Supplement 2): 2209-2215.

NAL Call Number: SF1 R45.

Keywords: heifers, cows, grazing, reproductive performance data, first calving, pregnancy rate, calf loss rate, reconception rate, sex effects, total herd loss rate, Portuguese language.

Costa e Silva, E.V.; Faria, C. L.; Santos, A. M.; Poleto, I.C.B.; Bezerra, A. C. (2000). **An evaluation of the basic costs of different techniques of preparation of bovine teasers, Brazil.** [Avaliacao dos custos basicos de diferentes tecnicas de preparacao de rufioes bovinos no Brasil.] *Revista Brasileira de Reproducao Animal* 24 (2): 90-100, ISSN: 0102-0803.

NAL Call Number: QP251 R48

Keywords: beef cattle, castration, cows, epididymis, surgery, vasectomy, bulls, costs , teasing, animal husbandry, estrus, Portuguese language, Brazil.

Drew, K.B. (1999). **Protocols for combined use of progestogen and prostaglandin in dairy and beef cattle.** *Cattle Practice* 7(1): 79-84, ISSN: 0969-1251.

NAL Call Number: SF961 C37.

Keywords: beef cattle, dairy cattle, cows, prostaglandins, progestogens, fertility, female fertility, estrus cycle, pregnancy rate, reviews, reproduction, biotechnology.

Ducrot, C.; Grohn, Y.T.; Bugnard, F.; Senlis, Y.; Sulpice, P.; Gilbert, R.O. (1999). **A field study on estrus detection in lactating beef cattle.** *Veterinary Research* 30(1): 87-98, ISSN: 0928-4249.

NAL Call Number: SF602 A5

Keywords: lactating beef cows, estrus, artificial insemination, tie stalls, calving, progesterone, animal housing, lactation, postpartum interval, France.

Geary, T.W.; Whittier, J.C.; Hallford, D.M.; MacNeil, M.D. (2001). **Calf removal improves conception rates to the Ovsynch and CO, Synch protocols.** *Journal of Animal Science* 79(1): 1-4, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cows, breed, postpartum interval, age, sire, synchronization of ovulation, Ovsynch protocol, calf removal, GnRH injection, blood samples, serum progesterone, conception rates.

Gordon, I. (1996). **Controlled Reproduction in Cattle and Buffaloes** CAB International: Wallingford, UK, 492 p., ISBN: 0851991149.

NAL Call Number: SF201 G67 1996.

Keywords: literature review, reproduction, estrous cycle, artificial control of estrus and ovulation, pregnancy testing, control of calving, reducing the calving interval, embryo transfer, in vitro fertilization, controlled breeding in buffaloes, embryo transfer and in vitro fertilization in buffaloes.

Grimard, B.; Bonnet, A.; Ponsart, C.; Rosso, V.; Humblot, P. (1998). **Influence of the number of artificial inseminations after oestrus synchronization treatment on fertility rate in suckled Charolais beef cows.** [Effet du nombre d'inseminations a l'oestrus induit sur la fertilité de vaches allaitantes charolaises synchronisées.] *Elevage et Insemination* 286: 3-10, ISSN: 0422-9703.

NAL Call Number: 43.8 EL22

Keywords: cows, oestrus synchronization, artificial insemination, fertility, reproductive performance, French language.

Grimard, B.; Marie Nely, F.; Valiergue, H.; Humblot, P. (1998). **Group management of beef cows. [Conduite en bandes de vaches allaitantes.]** *Elevage et Insemination* 284: 3-13, ISSN: 0422-9703.

NAL Call Number: 43.8 EL22

Keywords: cows, animal husbandry methods, estrus synchronization, reproduction control, reproductive performance, French language.

Holloway, J.W.; Warrington, B.G.; Forrest, D.W.; Randel, R.D. (2002). **Prewaning growth of F SUB 1 tropically adapted beef cattle breeds x Angus and reproductive performance of their Angus dams in arid rangeland.** *Journal of Animal Science* 80 (4): 911-918, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Brahman, Senepol, Tuli, Angus, breed, preweaning performance, calves, adaptation, growth, weight gain, genotype environment interaction, performance evaluation, meat production, reproductive performance, comparative study, Texas, semi arid zone, tropical zone.

Imwalle, D.B.; Daxenberger, A.; Schillo, K.K. (2002). **Effects of melengestrol acetate on the reproductive behaviour and concentrations of LH and testosterone in bulls.** *Journal of Animal Science* 80 (4): 1059-1067, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cattle, bulls, crossbred, blood plasma, luteinizing hormone, male fertility, melengestrol, progestogens, reproductive behavior, sexual behavior, flehmen, mounting, testosterone.

Imwalle, D.B.; Fernandez, D.L.; Schillo, K.K. (2002). **Melengestrol acetate blocks the preovulatory surge of luteinizing hormone, the expression of behavioral estrus, and ovulation in beef heifers.** *Journal of Animal Science* 80 (5): 1280-1284, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cattle, Angus, breed, heifers, luteinizing hormone, melengestrol, estrus behavior, ovulation, pharmacology, progesterone, reproduction, synchronization, synthetic progestogens.

Ingrand, S.; Dedieu, B. (1996). **Diversity of batch management in rearing beef cattle: Limousin herds. [Diversite des formules d'allotement en elevage bovin viande. Le cas d'exploitations du Limousin.]** *Productions Animales* 9 (3): 189-199, ISSN: 0990-0632.

Keywords: cows, Limousin, breed, female fertility, management, suckler herds, calving interval, France.

Jaume, C.M.; Souza, C.J.H.; Moraes, J.C.F. (2001). **Some factors that affect the fertility of beef cows in extensive production systems. [Alguns fatores que afetam a fertilidade de vacas de corte em sistemas extensivos.]** *Revista Brasileira de Reproducao Animal* 25 (2): 122-125, ISSN: 0102-0803.

NAL Call Number: QP251 R48

Keywords: beef cattle cows, body condition score, calving, climate, synchronization of estrus, fertility, pasture availability, pregnancy rate, Brazil, Portuguese language.

Jubb, T.F.; Fordyce, G.; Bolam, M.J.; Hadden, D.J.; Cooper, N.J.; Whyte, T.R.; Fitzpatrick, L.A.; Hill, F.; D'Occhio, M.J. (2003). **Trial introduction of the Willis dropped ovary**

technique for spaying cattle in northern Australia. *Australian Veterinary Journal* 81 (1-2): 66-70, ISSN: 0005-0423.

NAL Call Number: 41.8 Au72.

Keywords: beef cattle, Brahman, Brahman-Shorthorn, crossbred, female, heifer, Willis dropped ovary technique, ovariectomy, traditional paralumber spaying, traditional vaginal spaying method, animal welfare, body condition, body weight, mortality, pregnancy, Australia.

Kammerling, J. (2002). *Investigations on the Assessment and Control of Beef Cattle Parturition [Untersuchungen zur Bewertung und Beeinflussung von Geburten bei Mutterkuhen]*, Freie Universität Berlin: Berlin, Germany, 113p.

Keywords: beef cattle, calves, calving, dystocia, oxytocin, pharmacology, reproduction, stress factors, thesis, German language, Berlin, Germany.

Kastelic, J.P.; Cook, R.B.; Pierson, R.A.; Coulter, G.H. (2001). **Relationships among scrotal and testicular characteristics, sperm production, and seminal quality in 129 beef bulls.** *Canadian Journal of Veterinary Research* 65(2): 111-115, ISSN: 0830-9000.

NAL Call Number: SF601 C24

Keywords: crossbred beef bulls, 16 months old. breeding soundness examinations, measurement of scrotal surface temperature (SST), internal/scrotal testicular temperatures, testicular ultrasonographic echotexture, daily sperm production, epididymal sperm reserves, linear correlations, regression analysis.

Kunkle, W.E. (1998). **Higher pregnancy rates with better body condition.** *Large Animal Practice* 19 (1): 8-10, ISSN: 1092-7603.

NAL Call Number: SF601 B6.

Keywords: beef, cow, productivity, management, body condition, pregnancy rate.

Lamb, G.C.; Dahlen, C.R. (2002). **Past, present, and future impact of ultrasound technology on beef cattle reproductive research and management strategies.** *Journal of Animal Science* 80 (Supplement 2): 85, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: corpus luteum, endocrine system, reproductive system, follicle atresia, GnRH, IGF-binding proteins, androstenedione, estrogen, inhibin, progesterone, ultrasonography, imaging method, visualization method, CoSynch estrous synchronization system, early embryonic detection, fetal sexing, large animal reproduction, pregnancy rates, reproductive management strategies.

Lane, E.A.; Austin, E.J.; Roche, J.F.; Crowe, M.A. (2001). **The effect of estradiol benzoate on synchrony of estrus and fertility in cattle after removal of a progesterone-releasing intravaginal device.** *Theriogenology* 55(9): 1807-1818, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5.

Keywords: heifers, estradiol benzoate, progesterone-releasing intravaginal device (PRID), follicular development, ultrasonography, onset of estrus, estrus synchrony, fertility, pregnancy rates.

Larson, R.L. (1999). **Evaluating information obtained from pregnancy examinations in beef herds.** *Veterinary Medicine* 94(6): 566-573, 575-576.

NAL Call Number: 41.8 M69 .

Keywords: beef herds, pregnancy rate, data analysis, cattle husbandry, breeding season, reproductive disorders.

Lehr, A. (1997). **Etho-physiological reactions in mother cows and their calves during the peripartal period.** [Verhaltensphysiologische Reaktionen bei Mutterkuehen und ihren Kaelbern im peripartalen Zeitraum.] In: 3. Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL: Braunschweig-Voelkenrode, Germany, pp. 138-148, Series title, Landbauforschung Voelkenrode. Sonderheft (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2352 Suppl.

Keywords: beef cattle cows, mothers, calves, behavior, heart rate, movement, parturition, Germany, European Union, German language.

Lourens, D.C.; Thompson, P.N.; Bertschinger, H.J.; Ameen, M. (2002). **Evaluation of oestrus observation and conception rates in suckling beef cows using whole milk progesterone concentration.** *Journal of the South African Veterinary Association* 73 (4):190-194, ISSN: 1019-9128.

NAL Call Number: 41.8 So8

Keywords: cow, female, suckling, progesterone concentration, estrus indicator, artificial insemination, conception rate, optimal nutrition, intensive management.

Maracek, I.(2000). **Management of reproduction in beef cow herds without market production of milk.** [Riadenie reprodukcie v chovoch krav bez trhovej produkcie mlieka.] *Slovensky Veterinarsky Casopis* 25 (1): 22-27, ISSN: 1335-0099.

Keywords: cows, reproduction, beef cattle, calving interval, heifers, mating, parturition, puerperium, reproductive organs, service period, postpartum interval, animal husbandry, reproductive performance, Slovakian language.

Marsalek, M.; Frelich, J.; Zednikova, J. (1997). **Growth of beef breeds calves born from natural mating and artificial insemination.** *Sbornik Jihoceska Univerzita Zemedelska Fakulta Ceske Budejovice Zootechnicka Rada* 14 (1): 11-21, ISSN: 1210-6240.

Keywords: calves, cows, bulls, Angus, Simmental, breed, mating, natural, artificial insemination, calf live weight, average daily gain, growth, heredity testing, Czech language.

Martinez, M.F.; Kastelic, J.P.; Adams, G.P.; Cook, B.; Olson, W.O.; Mapletoft, R.J. (2002). **The use of progestins in regimens for fixed-time artificial insemination in beef cattle.** *Theriogenology* 57 (3):1049-1059, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5.

Keywords: beef cattle, heifers, estradiol benzoate, melengestrol acetate, gonadotropin releasing hormone, prostaglandin, progesterone, dosage, fertility drug, Co-Synch estrous synchronization, Ovsynch estrous synchronization, assisted reproduction method, fixed time artificial insemination, lactation, pregnancy rate.

Martinez, M.F.; Kastelic, J.P.; Adams, G.P.; Mapletoft, R.J. (2001). **The use of GnRH or estradiol to facilitate fixed-time insemination in an MGA-based synchronization regimen in beef cattle.** *Animal Reproduction Science* 67 (3-4): 221-229, ISSN: 0378-4320.

NAL Call Number: QP251.A5.

Keywords: crossbred beef cattle, pregnancy rates, GnRH or estradiol administration, melengestrol acetate (MGA) based estrus synchronization program, fixed-time insemination.

Mathew, S.R.; McCaughey, W.P.; Kennedy, A.D.; Lewis, N.J.; Crow, G.H. (1999).

Electronic monitoring of mounting behavior in beef cattle on pasture. *Canadian Veterinary Journal* 40 (11): 796-798, ISSN: 0008-5286.

NAL Call Number: 41.8 R3224.

Keywords: crossbred beef cows, monitoring, conception rate, automated heatmount detection system, estrus, detection, diurnal changes, pregnancy, pregnancy rate, Manitoba, Canada.

Matondang, R.H.; Bestari, J.; Siregar, A.R.; Panjaitan, H. (1999). **Analysis of beef cattle mother rearing on IB (Artificial Insemination) program in Agam (Indonesia).** [Analisis usaha pemeliharaan induk sapi potong pada program IB di Kabupaten Agam.] In: *Guide Book for National Seminar on Animal Husbandry and Veterinary.* [Buku Panduan Seminar Nasional Peternakan Dan Veteriner.] Puslitbangnak: Bogor, Indonesia, p. 66.

Keywords: beef cattle husbandry, calf production, reproduction, artificial insemination, Indonesian language, Indonesia.

Miettinen, P. (1996). **Effects of nutrition of reproduction (fertility and infertility) of dairy and beef cattle.** *Bovine Practitioner* 0 (30): 62-66, ISSN: 0524-1685.

NAL Call Number: SF779.5 A1B6.

Keywords: breeding, dairy production, energy metabolism, feed efficiency, feeding, fertility, infertility, meeting paper, nutrition, reproduction.

Moerchen, F.M. (1997). **Herd management during the perinatal period.**

[**Herdenbewirtschaftung im perinatalen Zeitraum.**] In: 3. Trenthorster Kolloquium, *Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany.* [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.] FAL: Braunschweig-Voelkenrode, Germany, pp. 213-223, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177. ISSN: 0376-0723.

NAL Call Number: 18 L2352 Suppl.

Keywords: beef cattle cows, mothers, calves, animal husbandry, animal feeding, nutritional requirements, energy, proteins, parturition, parturition complications, obstetrics, maternal behavior, Germany, European Union, German language.

Musofie, A.; Wardhani, N.K.; Lestari, S.B. (1998). **Assessment on beef cattle husbandry with artificial insemination technology in Daerah Istimewa Yogyakarta (Indonesia).** **Pengkajian sapi potong dengan teknologi inseminasi buatan di Daerah Istimewa Yogyakarta.** In: *Proceedings of Scientific Seminar and Workshop of Technology on Specific Location for Agricultural Developing with Agrobusiness Orientation.* [Prosiding Seminar Ilmiah Dan Lokakarya Teknologi Spesifik Lokasi Dalam Pengembangan Pertanian Dengan Orientasi Agribisnis.] Instalasi Penelitian dan Pengkajian Teknologi Pertanian: Yogyakarta, Indonesia, pp. 217-228, ISBN: 979-9007-09-7.

Keywords: artificial insemination, farmers, feeding, reproductive performance, animal husbandry methods, Indonesian language, Indonesia.

Naazie, A.; Makarechian, M.; Hudson, R.J. (1999). **Evaluation of life, cycle herd efficiency in cow, calf systems of beef production.** *Journal of Animal Science* 77 (1): 1-11, ISSN: 0021-8812.

NAL Call Number: 49 J82

Keywords: breed, beef synthetic 1, beef synthetic 2, dairy synthetic, Hereford, beef efficiency model, production, cow culling, cow, calf systems, life, cycle herd efficiency, reproductive performance.

Nicks, B.; Desiron, A.; Vandenheede, M.; Canart, B. (1999). **Incidence of the caesarean on the Belgian White and Blue cows and calves behaviour. [Incidences de la césarienne sur le comportement des vaches et de leur veau en race Blanc Bleu Belge.]** *Elevages Belges* 52(7-8): 14-17, ISSN: 0770-2216.

Keywords: calves, caesarean section, maternal behavior, milking, animal husbandry methods, surgical operations, French language.

Nishigai, M.; Kamomae, H.; Tanaka, T.; Kaneda, Y. (1999). **The influence of developmental stage and morphological quality of frozen, thawed bovine embryos on pregnancy rate in bovine embryo transfer.** *Journal of Reproduction and Development* 45 (4): 301-306, ISSN: 0916-8818.

NAL Call Number: SF1.K3

Keywords: heifers, Holstein, Japanese Black, breed, blastocyst, female, morula, embryo frozen, thawed embryo transfer, embryo transfer method.

Oliveira, J.F.C. de; Neves, J.P.; Moraes, J.C.F.; Gonçalves, P.B.D. (2002). **Characterization of productive aspects in Brangus Ibag cows with distinct levels of fertility (Caracteriza o de aspectos produtivos de vacas Brangus Ibag com distintos graus de fertilidade).** *Ciência Rural* 32(4): 663-667, ISSN: 0103-8478.

NAL Call Number: S192.R4

Keywords: beef cattle, reproductive performance, weight gain, maternal behavior, Rio Grande do sul, Brazil, Portuguese language.

Otoi, T.; Koyama, N.; Yamamoto, K.; Tachikawa, S.; Suzuki, T. (2000). **Effect of removal of large follicles after artificial insemination on embryo yield of superovulated beef cows.** *Canadian Journal of Animal Science* 80 (1): 199-201, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: artificial insemination, follicle removal, embryo transfer, embryo quality, freezable, superovulation.

Penny, C.D. (1998). **Practical oestrus synchronisation techniques in beef suckler herds.** *Cattle Practice* 6(3): 169-173. ISSN: 0969-1251.

NAL Call Number: SF961 C37.

Keywords: estrus cycle, estrus synchronization, artificial insemination, reproduction control.

Perry, G.A.; Smith, M.F.; Patterson, D.J. (2002). **Evaluation of a fixed-time artificial insemination protocol for postpartum suckled beef cows.** *Journal of Animal Science* 80 (12): 3060-3064, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: melengestrol acetate (MGA), oral progestin, gonadotropin-releasing hormone (GnRH), prostaglandin F2alpha (PG), estrus synchronization, fertility levels, herd studies, pregnancy rates.

Piedrafito, J.; Ruiz de la Torre, J.L.; Quintanilla, R.; Manteca, X. (2000). **Variation in gestation length as breeding season advances in Bruna dels Pirineus beef cattle breed.** *Annales de Zootechnie* 49(4): 353-356, ISSN: 0008-424X.

NAL Call Number: 49 F84.

Keywords: beef cattle, cows, Bruna dels Pirineus, breed, breeding season, pregnancy, gestation period, domestication, mating, natural service, Spain.

Pleasant, A.B. (1997). **Use of a stochastic model of a calving distribution for beef cows for formulating optimal natural mating strategies.** *Animal Science: An International Journal of Fundamental and Applied Research* 64(3): 413-421.

Keywords: cows, parturition, copulation, mathematical models, mating systems, parturition interval, reproductive performance, statistical methods, estrus cycle, gestation period, time, developmental stages, animal performance, biological rhythms, developmental stages.

Rae, D.O.; Ramsay, K.H.; Morrison, R.L. (2002). **Effect of chlortetracycline in a trace mineral salt mix on fertility traits in beef cattle females in Florida.** *Journal of Animal Science* 80 (4): 880-885, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: The study objective was to determine the effect of chlortetracycline in an ad libitum trace-mineralized salt mix given to heifers before and/or during bull exposure on the proportion pregnant and the time to conception in a fixed breeding period. Heifers (n = 768), 13 to 15 mo of age, were individually identified, immunized (*Leptospira*, *Campylobacter fetus*), examined (body condition score, vaginal lesion score, BW), and randomly allocated within 2 x 2 factorial blocks of treatments where trace mineral salt with and without chlortetracycline medication was provided in similar but nonadjacent pastures either before and/or during bull exposure. The chlortetracycline feeding period was about 30 d for each. In the 2 d immediately before bull exposure, heifers were examined (body condition score, vaginal lesion score, reproductive tract evaluation) and reallocated to treatment pastures. Pregnancy was determined by per rectal palpation at 45 d following bull removal. Mineral intake was below that expected for heifer groups and, as a result, chlortetracycline intake was estimated at less than one-third of that targeted. Many heifers were not cycling reproductively at the onset of bull exposure (n = 456, 60.3%, based on a reproductive tract score < 3). Despite these limitations, heifers receiving chlortetracycline treatment before breeding had a pregnancy percentage of 65% (chlortetracycline before and during breeding 67% and chlortetracycline before breeding 61.8%) compared to those receiving no treatment before breeding (53%, $P < 0.03$; no chlortetracycline before or during breeding 60.4% and chlortetracycline during breeding 47.4%). Heifers receiving chlortetracycline treatment before breeding were 57% more likely to become pregnant than those not treated before breeding. Change in vaginal lesion score was associated with the proportion pregnant, but neither body condition score nor average daily gain were.

Keywords: antibiotics, tetracycline, pharmacology, chlortetracycline, fertility, breeding, reproduction.

Rasyid, A.; Yusran, M.A.; Ma'sum, K. (1996). **Effect of age on semen production in Madura cattle. [Pengaruh terhadap produksi semen pada sapi Madura.]** In: *Proceedings of scientific meeting on animal husbandry research results: application for small scale industry. [Prosiding temu ilmiah hasil-hasil penelitian peternakan: aplikasi hasil penelitian*

untuk industri peternakan rakyat.] Basuno, E.; Mahyuddin, P.B.; Saepudin, Y.; Hidayat, S. (eds.), Balitnak: Bogor, Indonesia, pp. 229-233, ISBN: 979-8261-27-5.

Keywords: bulls, breed, Mandura, age, parameters measured, semen volume, sperm concentration, motile sperm, consistency and semen pH, Indonesian Language, Indonesia.

Rawlings, N.C.; Kastelic, J.P.; Evans, A.C.O.; Bartlewski, P.M.; Beard, A.P.; Chandolia, R.K.; Cook, S.J. (2002). **Plasma concentrations of cortisol and progesterone during the period of reproductive development in beef and dairy heifers.** *Animal Science: An International Journal of Fundamental and Applied Research* 75 (2): 281-288, ISSN: 1357-7298.

NAL Call Number: SF1.A56

Keywords: age, beef cattle, blood plasma, corticotropin, heifers, hydrocortisone, progesterone, reproduction, handling, naive versus handled heifers.

Reddy, M.; Davis, M.E.; Simmen, R.C.M. (1996). **Correlated responses in scrotal circumference, semen traits, and reproductive performance due to selection for increased or decreased blood serum IGF, I concentration in Angus beef cattle.** *Journal of Animal Science* 74 (SUPPL. 1): 108, ISSN: 0021-8812.

NAL Call Number: 49 J82

Keywords: adult, angus, beef breed, calf crop percentage, calving date records, dam, female, Igf-I, insulin-like growth factor-1, levels, male, mating records, meeting abstract, reproductive performance, reproductive system, scrotal circumference, semen traits.

Richardson, A.M.; Hensley, B.A.; Marple, T.J.; Johnson, S.K.; Stevenson, J.S. (2002). **Characteristics of estrus before and after first insemination and fertility of heifers after synchronized estrus using GnRH, PGF2 alpha, and progesterone.** *Journal of Animal Science* 80(11): 2792-2800, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: animal behavior, artificial insemination, beef cattle, conception rate, dairy cattle, female fertility, GnRH, heifers, estrus, pregnancy rate, progesterone, prostaglandins, sexual behavior, synchronization, synchronized females.

Riha, J.; Seidenglanz, J. Wenkoff, M.S.; Smith, A.; Millar, P. (1996). **Embryo transfer in extensive beef cattle breeds.** *Zivocisna Vyroba - UZPI* 41(6): 237-244, ISSN: 0044-4847.

NAL Call Number: 49.9 C33

Keywords: cows, imported beef breed embryos, Hereford, Aberdeen-Angus, Galloway, Highland, embryo transfer, embryo preservation, estrus synchronization, superovulation, conception rates, biological preservation, Czech Republic.

Rodriguez, R.O.L.; Rivera, M.J. (1999). **Fertility of beef cattle females with mating stimuli around insemination.** *Animal Reproduction Science* 54(4) : 221-226, ISSN: 0378-4320.

NAL Call Number: QP251.A5.

Keywords: cows, sexual behavior, stimuli, fertility, artificial insemination, pregnancy, copulation, husbandry methods.

Ruas, J.R.M.; Marcatti Neto, A.; Amaral, R. (2000). **Considerations about the handling at the pre and pos-parturition beef cows and their reflexes about the reproductive performance.** [Consideracoes sobre o manejo no pre e pos-parto de vacas de corte e seus reflexos sobre a eficiencia reprodutiva.] *Informe Agropecuario: Empresa de Pesquisa Agropecuaria de Minas Gerais* 21(205): 70-75, ISSN: 0100-3364.

Keywords: reproduction, copulation, parturition, fertilization, Portuguese language, Brazil.

Selph, J.F.; Hogue, P.J.; Stice, E.J.; Seawright, T.E.; Gary, L.A.; Mikulecky, G.; Arthington, J.D.; Sand, R.S. (2002). **Beef cattle reproductive management school of The South Florida Beef-Forage Program.** *Journal of Animal Science* 80 (Supplement 2): 6-7, ISSN: 0021-8812.
NAL Call Number: 49 J82.

Keywords: South Florida Beef-Forage Program, breeding, herd management, nutrition, pregnancy, reproduction, reproductive management school, education.

Sinclair, K.D.; Broadbent, P.J. (1996). **Increasing the efficiency of suckled calf production using embryo transfer technology.** *Veterinary Record* 139 (17): 409-412, ISSN: 0042-4900.
NAL Call Number: SF601 I4.

Keywords: beef calf production, embryo transfer, efficiency, technology, animal breeding, genetic progress, economics, pregnancy rates, management of twin-bearing cows.

Smeaton, D.C.; Vivanco, W.H. (2002). **Profitability of the use of new reproductive technologies in beef production systems.** *Proceedings of the New Zealand Society of Animal Production*, pp.133-137, ISSN: 0370-2731.
NAL Call Number: 49.9 N483.

Keywords: embryo transfer, fertilization method, new reproductive technology, beef industry, beef production systems, new reproductive technology, profitability, sex ratio.

Soto, R.; Rubio, I.; Galina, C.S.; Castillo, E.; Rojas, S. (2001). **Effect of pre- and post-partum feed supplementation on the productive and reproductive performance of grazing primiparous Brahman cows.** *Tropical Animal Health and Production* 33 (3): 253-264, ISSN: 0049-4747.
NAL Call Number: SF601 T7.

Keywords: Brahman cows, breed, feed supplementation, pre- and post-calving, reproductive performance, digestible energy, dry matter, crude protein, body weight, body condition score, urea, plasma, estrus, pregnancy rates.

Spire, M.F. (1997). **Managing replacement heifers from weaning to breeding.** *Veterinary Medicine* 92(2): 182-183, 186-192.
NAL Call Number: 41.8 M69.

Keywords: heifers, replacement, beef cattle, reproductive performance, optimization, husbandry.

Stevenson, J.S.; Thompson, K.E.; Forbes, W.L.; Lamb, G.C.; Grieger, D.M.; Corah, L R (2000). **Synchronizing estrus and(or) ovulation in beef cows after combinations of GnRH, norgestomet, and prostaglandin F2alpha with or without timed insemination.** *Journal of Animal Science* 78(7): 1747-1758, ISSN: 0021-8812.
NAL Call Number: 49 J82.

Keywords: suckled beef cows, gonadotropin releasing hormone (GnRH), fertility drug, norgestomet, prostaglandin F-2-alpha (PGF-2-alpha), implant, artificial insemination, body condition score, analytical method, estrus synchronization, assisted reproduction method, ovulation synchronization, assisted reproduction method, breeding season, conception rate, ovulation, pregnancy rate.

Todoroki, J.; Yamakuchi, H.; Mizoshita, K.; Kubota, N.; Tabara, N.; Noguchi, J.; Kikuchi, K.; Watanabe, G.; Taya, K.; Kaneko, H. (2001). **Restoring ovulation in beef donor cows with ovarian cysts by progesterone-releasing intravaginal silastic devices.** *Theriogenology* 55(9): 1919-1932, ISSN: 0093-691X.

NAL Call Number: QP251.A1T5.

Keywords: beef cows, reproductive problems, ovarian cysts, Controlled Internal Drug Release, progesterone-releasing intravaginal silastic device, estrus behavior, follicular development, plasma estradiol

Valle, E.R. do; Andreotti, R.; Thiago, L.R.L. (1998). **Strategies for the improvement of reproductive performance in beef cattle. [Estrategias para aumento da eficiencia reprodutiva e produtiva em bovinos de corte.]** Centro Nacional de Pesquisa de Gado de Corte (CNPGC) (EMBRAPA): Campo Grande, Brazil, *Documentos- Centro Nacional de Pesquisa de Gado de Corte (No. 71)*: 80 p., ISSN: 0100-9443.

Keywords: tropics, beef cattle, cows, female fertility, breeding season, male fertility, body condition, mating systems, pregnancy diagnosis, culling, weaning, animal nutrition, animal health, animal husbandry, reproduction, calf production, reviews, Portuguese language, Brazil.

Vasilev, G. (1996). **Experiments for application of a rearing cyclogram for beef cattle. [Opiti za prilagane na tsiklograma pri otglezhdane na goveda mesodajno napravlenie.]** *Zhivotnov'dni Nauki, Animal Science* 33(7-8): 51-54, ISSN: 0514-7441.

Keywords: reproduction, estrus synchronization, artificial insemination, Bulgarian language.

Vassena, R.; Adams, G.P.; Mapletoft, R.J.; Pierson, R.A.; Singh, J. (2003). **Ultrasound image characteristics of ovarian follicles in relation to oocyte competence and follicular status in cattle.** *Animal Reproduction Science* 76 (1-2): 25-41, ISSN: 0378-4320.

NAL Call Number: QP251.A5.

Keywords: beef cattle, crossbred, in vitro culture, in vitro fertilization, culturing techniques, non-invasive method, ultrasound, imaging and microscopy techniques, follicular status.

White, F.J.; Wettemann, R.P.; Looper, M.L.; Prado, T.M.; Morgan, G.L. (2002). **Seasonal effects on estrous behavior and time of ovulation in nonlactating beef cows.** *Journal of Animal Science* 80 (12): 3053-3059, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef cattle, cows, reproductive behavior, diurnal variation, mating behavior, estrous cycle, HeatWatch system, duration of estrus, ovulation, seasonal variation.

Yamamoto, N.; Koike, T.; Entsu, S.; Otani, I. (1997). **Economic evaluation of embryo transfer on animal production.** *Bulletin of the Chugoku National Agricultural Experiment Station* 17: 1-26, ISSN: 0913-4239.

NAL Call Number: S471 J3C84.

Keywords: milk and beef production, breed, Wagyu, embryo transfer, economic analysis, animal production, pregnancy, artificial insemination, Japanese language, Japan.

Yavas, Y.; Walton, J.S.. (2000). **Induction of ovulation in postpartum suckled beef cows: a review.** *Theriogenology* 54(1): 1-23.

NAL Call Number: QP251.A1T5.

Keywords: suckled beef cows, calf crop, economic loss, anterior pituitary LH, comparison of methods to initiate cyclicity, weaning of calves (either complete, temporary or partial),

exposure to bulls, hormonal methods such as administration of GnRH (either single injection, intermittent injections, or continuous infusion), gonadotropins (eCG, FSH, hCG), steroids (estrogens, anti-estrogens, and progestogens), exogenous progestogens, intravaginal devices, controlled-internal drug release (CIDR), progesterone-releasing intravaginal device (PRID), norgestomet implants, feed-additive melengestrol acetate (MGA).

Yavas, Y.; Walton, J.S. (2000). **Postpartum acyclicity in suckled beef cows: a review.** *Theriogenology* 54(1): 25-55.

NAL Call Number: QP251.A1T5.

Keywords: suckled beef cows, economic loss, suckling status, nutritional status, calving season, age, dominant follicles, LH pulses, hypothalamic GnRH, negative feedback effect of ovarian estradiol-17 β , premature luteolysis, PGF2 α .

Slaughter

Andrae, J.G.; Duckett, S.K.; Hunt, C.W.; Pritchard, G.T.; Owens, F.N. (2001). **Effects of feeding high-oil corn to beef steers on carcass characteristics and meat quality.** *Journal of Animal Science* 79(3): 582-588. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: yearling steers, high-oil corn, carcass characteristics, slaughter, postmortem, carcass, intramuscular lipid deposition, unsaturated fatty acids.

Apple, J.K.; Davis, J.C.; Stephenson, J. (1999) **Influence of body condition score on by-product yield and value from cull beef cows.** *Journal of Animal Science* 77(10): 2670-9. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: mature beef cows, British and Continental phenotypes, slaughter, body condition score (BCS), by-product yield, by-product weights, blood, feet (with hooves attached), oxlips, tongue, gullet, trachea, cheek meat, head meat, skull, tripe, honeycomb tripe, large and small intestines, spleen, mesenteric fat, weasand meat, kidneys, heart, lungs, oxtail.

Basarab, J.A.; Milligan, D.; Thorlakson, B.E. (1997). **Traceback success rate of an electronic feedlot to slaughter information system for beef cattle.** *Canadian Journal of Animal Science* 77 (3): 525-528, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: yearling cattle, electronic identification eartag, equipment, reliability, slaughter information system, traceback success rate, Canada.

Chambaz, A.; Dufey, P.A.; Kreuzer, M.; Gresham, J. (2002). **Sources of variation influencing the use of real-time ultrasound to predict intramuscular fat in live beef cattle.** *Canadian Journal of Animal Science* 82 (2):133-139, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: European breeds, Angus, Simmental, Charolais, Limousin, Blonde d'Aquitaine, Piedmontese, longissimus muscle, collagen, real-time ultrasound, imaging method, hide thickness, intramuscular fat, slaughter.

Chambaz, A.; Kreuzer, M.; Scheeder, M.R.L.; Dufey, P.A. (2001). **Characteristics of steers of six beef breeds fattened from eight months of age and slaughtered at a target level of intramuscular fat: II. Meat quality.** *Archiv fuer Tierzucht* 44 (5): 473-488, ISSN: 0003-9438.

NAL Call Number: 49 AR23.

Keywords: Angus, Simmental, Charolais, Limousin, Blonde d'Aquitaine, Piedmontese steers, breed differences, forage-based diet, 3.5% intramuscular fat (IMF), ultrasound assessments, housing, tie stall barn, loose housing, straw bedding. M. biceps femoris, M. longissimus dorsi, M. regio glutea, muscular system, collagen solubility, heme iron, intramuscular fat, meat quality, pH, shear force, tie-barn stall.

Conedera, G.; Marangon, S.; Chapman, P.A.; Zuin, A.; Caprioli, A. (1997). **Atypical strains of verocytotoxin, producing Escherichia coli O157 in beef cattle at slaughter in Veneto Region, Italy.** *Journal of Veterinary Medicine Series B* 44 (5): 301-306, ISSN: 0931-1793.

NAL Call Number: 41.8 Z52

Keywords: slaughter, abattoirs, carcass contamination, *Escherichia coli* O157, infection, pathogen, serogroup O157, transmission risk, urease, verocytotoxin, producing, transmission to humans, Italy.

Cummins, L.; Knee, B.; Butler, K.; Warner, R.; Walker, P. (2000). **Stocking pressure and seasonal influences on muscle glycogen levels in beef cattle.** *Asian, Australasian Journal of Animal Sciences* 13(Supplement Vol. B): 237, ISSN: 1011-2367.

NAL Call Number: SF55 A78A7.

Keywords: beef quality defects, dark, cutting beef, meat, glycogen, grazing production systems, post, mortem rigor development, seasonal influences, stocking pressure.

Dabrowska, J. (2000). **Pre-slaughter treatment of Black-and-White bulls and their slaughter value.** [Przygotowanie przedubojowe buhajkow czarno-bialych a ich wartosc rzezna.] *Annals of Warsaw Agricultural University. Animal Science* 375(24): 255-262, ISSN: 1232-3071.

Keywords: bulls, breed, Black-and-White, Ketomix supplement, intravenous glucose infusion, electrolyte drink antemortem stress, carcass composition, slaughtering, pH, low glycogen content, beef quality, Polish language, Poland.

Dell'Orto, V.; Rossi, C.A. S.; Gianazza, S.; Ripamonti, G. (1999). **Effects of vitamin E on meat quality.** [Effetti della vitamina E sulla qualita della carne.] *Informatore Agrario* 55 (49): 33-37, ISSN: 0020-0689.

NAL Call Number: 281.8 IN32.

Keywords: Limousin, Charolais, breeds, vitamin E, supplements, meat quality, stress, transport, slaughter, beef cattle, heavy metals, toxicity, meat keeping quality, Italian language.

Elder, R.O.; Keen, J.E.; Siragusa, G.R.; et al. (2000). **Correlation of enterohemorrhagic *Escherichia coli* O157 prevalence in feces, hides, and carcasses of beef cattle during processing.** *Proceedings of the National Academy of Sciences of the United States of America* 97 (7): 2999-3003, ISSN: 0027-8424.

NAL Call Number: 500 N21P

Keywords: feeder cattle, slaughter, survey, frequency, enterohemorrhagic *Escherichia coli*, strain, O157:H7, carcass contamination, sanitary procedures.

Fouilloux, M.; Noelle, R.G.; Gaillard, J.; Menissier, F. (2000). **Genetic correlation estimations between artificial insemination sire performances and their progeny beef traits both measured in test stations.** *Genetics Selection Evolution (Paris)* 32(5): 483-499, ISSN: 0999-193X.

NAL Call Number: QH431 A1A52.

Keywords: bulls, sire performance testing, artificial insemination, carcass composition, carcass fatness score, diet, genetic correlation, progeny beef traits, progeny dressing percentage, progeny growth, progeny skeletal frames, sire muscling scores, France.

Gazzola, C.; Jeffery, M. R.; White, D. H.; Hill, R. A.; Reid, D. J. (2001). **Effect of age of castration, oestradiol treatment and genotype on the fat colour of beef cattle raised at pasture.** *Animal Science: An International Journal of Fundamental and Applied Research* 73(2): 261-266, ISSN: 1357-7298.

NAL Call Number: SF1.A56.

Keywords: steers, age at castration, post-pubertal surgical castration, growth patterns, estradiol treatment, fat color, yellow fat, genotypes, grazing.

Grandin, T. (2001). **Cattle vocalizations are associated with handling and equipment problems at beef slaughter plants.** *Applied Animal Behaviour Science* 71(3): 191-201, ISSN: 0168-1591.

NAL Call Number: QL750.A6.

Keywords: abattoirs, commercial slaughter plants, behavior, animal welfare, stress, vocalization, aversive events, prodding with electric prods, slipping in the stunning box, missed stuns, sharp edges on equipment, excessive pressure from a restraint device, facility and equipment modifications, proper lighting, false floors, reduced voltage of electric prod, Australia, Canada, USA.

Gregory, N.G. (1996). **Welfare and hygiene during preslaughter handling.** *Meat Science* 43(Suppl.): S35-S46.

NAL Call Number: TX373 M4.

Keywords: meat quality, slaughter, animal welfare, stress, abattoirs, carcass quality, damage, food hygiene, literature reviews, glycogen, muscles, metabolism, handling, fish, pigs, beef cattle.

Grona, A.D.; Tatum, J.D.; Belk, K.E.; Smith, G.C.; Williams, F.L. (2002). **An evaluation of the USDA standards for feeder cattle frame size and muscle thickness.** *Journal of Animal Science* 80 (3): 560-567, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: feeder cattle, frame size, longissimus muscle, USDA meat grade standards, meat product, carcass, muscle thickness, meat grade, muscle weight.

Henricks, D.M.; Gray, S.L.; Owenby, J.J.; Lackey, B.R. (2001). **Residues from anabolic preparations after good veterinary practice.** *APMIS* 109(4): 273-83.

Keywords: detection of estrogens in edible tissues of beef cattle, muscle, liver, kidney, fat tissues, E2beta (active isomer), radioimmunoassays, anabolic ear implants,.

Hernandez, D.A.J.; Renteria, E.T.; Lopez, V.G.; Montano, H.M. (1997). **An abattoir monitoring system for diagnosis of tuberculosis in cattle in Baja California, Mexico.** *Journal of the American Veterinary Medical Association* 211 (6): 709-711, ISSN: 0003-1488.

NAL Call Number: 41.8 Am3.

Keywords: beef, dairy, abattoir monitoring system, disease monitoring system, bacterial disease diagnosis, epidemiology, infection, prevalence, tuberculosis, lymph node, tissue specimens, lesions, Mexico.

Hirooka, H. (2000). **Evaluation of testing schemes with clones for carcass traits in beef cattle.** *Animal Science Journal* 71 (7): J19-J25, ISSN: 1344-3941.

NAL Call Number: SF1 A542.

Keywords: beef bulls, clone testing scheme, breeding method, progeny testing, scheme, breeding method, carcass traits, genetic gains, heritability, selection index, Japanese language, Japan.

Jago, J.G.; Matthews, L.; Bass, J.J.; Knight, T.W. (1996). **A comparison of two methods of castration on post, pubertal beef cattle and their effect on behaviour, growth and ultimate pH.** *Proceedings of the New Zealand Society of Animal Production* 56 (0): 394-397, ISSN: 0370-2731.

NAL Call Number: 49.9 N483.

Keywords: bulls, pubertal, effects of surgical and immunocastration, sexual behavior, aggressive behavior, plasma testosterone growth, slaughter, meat quality, hot carcass weight, pH.

Jung, K.K.; Sung, S.K.; Choi, C.B. Kim, D.G. Kim, S.G.; Kim, D.Y.; Choi, B.J. (1996). **Effects of castration on the carcass characteristics of Hanwoo and Holstein.** *Korean Journal of Animal Science* 38(3): 239-248, ISSN: 0367-5807.

NAL Call Number: 49.9 H19.

Keywords: beef cattle, castration, carcasses, chemico-physical properties, organoleptic analysis, statistical methods, Korean language, Korea.

Keane, M.G.; Allen, P. (2002). **A comparison of Friesian-Holstein, Piemontese X Friesian-Holstein and Romagnola X Friesian-Holstein steers for beef production and carcass traits.** *Livestock Production Science* 78 (2): 143-158, ISSN: 0301-6226.

NAL Call Number: SF1.L5.

Keywords: beef cattle, steers, beef breeds, breed differences, carcass composition, carcass quality, Romagnola, Holstein-Friesian, Piemontese, evaluation, genetic variation, animal husbandry, feed rations, feed intake, finishing, duration, concentrates, feed supplements, grass silage, body fat, bones, muscles, fat.

Keane, M. G.; Allen, P. (1998). **Effects of production system intensity on performance, carcass composition and meat quality of beef cattle.** *Livestock Production Science* 56(3): 203-214, ISSN: 0301-6226.

NAL Call Number: SF1 L5.

Keywords: Charolais x Friesian male cattle, meat production, bulls, steers, animal husbandry, beef production, extensive livestock farming, intensive livestock farming, silage, pasture, farming systems, meat quality, carcass quality, age, growth, dressing percentage, conformation, carcass composition, fat, tenderness, taste, profitability, Irish Republic.

Kilpatrick, D.J.; Steen, R.W.J. (1999). **A predictive model for beef cattle growth and carcass composition.** *Agricultural Systems* 61(2): 95-107, ISSN: 0308-521X.

NAL Call Number: HD1 A3.

Abstract: Due to public concerns over food quality and animal welfare, beef producers are under increasing pressure to produce a high-quality product while still maintaining economic efficiency. Hence the need for a model for the accurate prediction of growth and carcass composition of beef cattle that is flexible enough to deal with the wide range of breeds of cattle and feeding regimes, either silage only or supplemented with concentrates, encountered on UK farms. This paper describes a model that has been developed based on a substantial database of experimental observations from a series of trials carried out by the Department of Agriculture for Northern Ireland. If animal and feed costs are provided, the model can provide information on the most economic level of concentrate feeding to achieve the animal growth and quality of carcass.

Keywords: beef cattle, carcass composition, growth rate, metabolizable energy, dry matter, feed intake, flow charts, carcass weight, simulation models, prediction, cattle farming, UK.

Kobolak, J.; Gocza, E. (2002). **The role of the myostatin protein in meat quality: A review.** *Archiv fuer Tierzucht* 45 (2):159-170, ISSN: 0003-9438.

NAL Call Number: 49 AR23.

Keywords: breed, Belgian White-Blue, myostatin gene, beef, meat product, breeding, carcass composition, meat quality, muscle hypertrophy.

Kreikemeier, K.K.; Unruh, J.A.; Eck, T.P. (1998). **Factors affecting the occurrence of dark-cutting beef and selected carcass traits in finished beef cattle.** *Journal of Animal Science* 76(2): 388-395. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: A data set was used to determine how various factors affect the occurrence of dark-cutting beef and selected carcass traits in finished beef cattle. Data were collected in 1989 and 1990 from one packer with plants located in Amarillo, TX; Boise, ID; Dakota City, NE; and Garden City, KS. The data set consisted of 3,659 lots consisting of 724,639 cattle. Compared with those at Boise and Dakota City, cattle slaughtered in Amarillo and Garden City had a higher incidence of dark cutters (1.1 vs .3%; $P < .01$) and a lower quality grade (50 vs 64% Choice plus Prime; $P < .01$). The highest incidences of dark cutters occurred during August, September, and October (1.1 to 1.4%; $P < .01$), with incidences of .4 to .7% during the other months. Carcass quality grade was higher during January, February, and March compared with May through November (60 to 62% Choice plus Prime vs 52 to 58%; $P < .01$). As the number of cattle in a lot increased, the incidence of dark cutters increased from .4 to 1.2% ($P < .01$), and quality grade declined from 62 to 52% Choice plus Prime ($P < .01$). As the mean weight of cattle in the lot increased, the incidence of dark cutters declined from .94 to .6% ($P < .01$), and carcasses grading Choice plus Prime increased from 56 to 62% ($P < .01$). With cattle held over a weekend or holiday, ("carry cattle") the incidence of dark cutters increased from .8 to 1.6% ($P < .01$). We conclude that packing plant location, month of the year, weight of cattle, carry cattle, and number of cattle in a lot are most likely to influence the incidence of dark cutters and carcass quality traits.

Keywords: beef quality, carcass quality, carcass yield, dark cutting meat, winter, summer, body weight, feedlots, group size, heifers, steers, sex differences, seasonal fluctuations, stress response.

Laborde, F.L.; Mandell, I.B.; Tosh, J.J.; Buchanan-Smith, J.G.; Wilton, J.W. (2002). **Effect of management strategy on growth performance, carcass characteristics, fatty acid composition, and palatability attributes in crossbred steers.** *Canadian Journal of Animal Science* 82 (1): 49-57. ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Abstract: Crossbred steers ($n = 136$) were used to evaluate the effect of management strategy on growth performance, carcass characteristics, and fatty acid composition and palatability attributes of beef. Management strategies included: (1) high grain (75% high moisture corn) finishing (HG), or (2) backgrounding with restricted feeding of an alfalfa silage ration for 112 d, followed by HG until slaughter (BKG). Steers were slaughtered at 8-10 mm ultrasound backfat. Backgrounding increased ($P < 0.001$) days on feed and decreased ($P < 0.01$) days on grain, average daily gain and longissimus muscle area compared with the HG regime. Slaughter weight, intramuscular fat content, and marbling score were unaffected ($P > 0.10$) by management strategy. Longissimus muscle palatability attributes and shear force did not differ ($P > 0.10$) between management strategies, whereas BKG increased ($P < 0.03$) softness, overall tenderness, chewiness, and rate of breakdown scores, and decreased ($P < 0.09$) juiciness scores in semitendinosus muscle. Backgrounding increased ($P < 0.05$) conjugated linoleic acid (CLA), total monounsaturated fatty acids, and omega3 polyunsaturated fatty acid (PUFA), and decreased ($P < 0.05$) total saturated fatty acids (SFA), and omega6 PUFA.

content of beef. While the change in quantitative and qualitative fatty acid composition of beef is in line with current dietary recommendations for humans, the magnitude of these changes was minimal.

Keywords: beef cattle, steers, animal husbandry, growth, performance, carcass composition, fatty acids, palatability, crossbreds, meat quality, feeds, finishing, silage, backfat, fat thickness, liveweight gain, muscles, slaughter weight, leanness, tenderness, flavor, moisture content.

Lynch, A.; Buckley, D.J.; Galvin, K.; Mullen, A.M.; Troy, D.J.; Kerry, J.P. (2002).

Evaluation of rib steak colour from Friesian, Hereford and Charolais heifers pastured or overwintered prior to slaughter. *Meat Science* 61 (3): 227-232, ISSN: 0309-1740.

NAL Call Number: TX373 M4.

Keywords: breed, Charolais, Friesian, Hereford, heifer, alpha-tocopherol, monounsaturated fatty acids, polyunsaturated fatty acid, breed differences, carcass quality, meat color, overwintering, pasture, rib steak, meat product, slaughter.

Nagaraja, T.G.; Chengappa, M.M. (1998). **Liver abscesses in feedlot cattle: a review.**

Journal of Animal Science 76(1): 287-98. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: health, slaughter, grain feeding, diet, management factors, economic loss, reduced feed intake, reduced weight gain, decreased feed efficiency, decreased carcass yield, *Fusobacterium necrophorum*, ruminal anaerobic bacterial flora, *Actinomyces pyogenes*, etiologic agent, treatment, antimicrobial compounds, bacitracin methylene disalicylate, chlortetracycline, oxytetracycline, tylosin, virginiamycin.

Naruse, M.; Kajikawa, H.; Morita, H.; Hashiba, K.; Maruyama, S.; Morimoto, H.; Miura, Y.; Fujita, K.; Fuke, T.; Amari, M.; Masaki, S.; Ozutsumi, K.; Abe, A. (1996). **Relationships of dietary and ruminal characteristics to carcass traits in Wagyu steers (*Bostaurus*).** *Animal Science and Technology* 67(2): 146-152, ISSN: 0918-2365.

NAL Call Number: 49 N62.

Keywords: breed, Wagyu (Japanese Black cattle), feeds, rumen digestion, volatile fatty acid (vfa), feed intake, carcass composition fat deposition, longissimus muscle, marbling score, rib-eye area.

Oka, A.; Iwaki, F.; Dohgo, T.; Ohtagaki, S.; Noda, M.; Shiozaki, T.; Endoh, O.; Ozaki, M.. (2002). **Genetic effects on fatty acid composition of carcass fat of Japanese Black Wagyu steers.** *Journal of Animal Science* 80 (4): 1005-1011, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breed, Japanese Black Wagyu, steers, fatty acid, carcass fat composition, monounsaturated fatty acids, carcass, carcass fat, carcass fat fatty acid composition, genetic effects.

Papstein, H.; Losand, B.; Fiedler, I.; Hartung, M.; Ender, K. (1999). **Investigations on growth of intensively fed male and female beef cattle twins and singles 2nd communication: Carcass composition, meat characteristics and muscle structure.** *Zuechtungskunde* 71 (4): 267-276, ISSN: 0044-5401.

NAL Call Number: 49 Z8

Keywords: bulls, heifers, carcass composition, growth of tissues and organs, meat, color, protein content, quality, carcass composition, muscle structure, intensive feeding, German language.

Pastushenko, V. (2000). **Organic animal husbandry increases docosahexaenoic acid and conjugated linoleic acid in the beef meat.** [Ekologiczny system utrzymania zwierząt wpływa na podwyższenie poziomu kwasu dokozaheksaenowego (DHA) i koniugowanego kwasu linolenowego (CLA) w miesie wołowym.] *Zeszyty Naukowe Akademii Rolniczej we Wrocławiu. Konferencje* 375(24): 277-278, ISSN: 1232-3071.

Keywords: animal husbandry methods, carcass composition, beef, quality, chemical composition, fatty acids, alternative agriculture, acids, animal products, farming systems, Germany.

Penny, C.D.; Lowman, B.G.; Scott, N.A.; Scott, P.R. (1997). **Repeated oestrus synchrony and fixed-time artificial insemination in beef cows.** *Veterinary Record* 140(19): 496-498. **NAL Call Number:** SF601 I4.

Keywords: breeding, pregnancy diagnosis, prostaglandins, fertility, artificial insemination, beef cattle, estrus synchronization, mating systems.

Perotto, D.; Abrahao, J.J. dos S.; Moletta, J.L. (2000). **Quantitative carcass traits of Zebu and crossbred Bos taurus x Zebu.** [Características quantitativas de carcaca de bovinos Zebu e de cruzamentos Bos toaurus x Zebu.] *Revista Brasileira de Zootecnia* 29(6)(Suppl. 1): 2019-2029, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: crossbreeding, breed , Zebu, carcasses, feedlots, age, weight, slaughtering, Portuguese language, Brazil.

Petherick, J.C.; Holroyd, R.G.; Doogan, V.J.; Venus, B.K. (2002). **Productivity, carcass and meat quality of lot-fed Bos indicus cross steers grouped according to temperament.** *Australian Journal of Experimental Agriculture* 42 (4): 389-398., ISSN: 0816-1089. **NAL Call Number:** 23 Au792.

Keywords: steers, beef cattle, carcass quality, meat quality, performance, temperature, feedlots, liveweight, body condition, feed intake, handling, fearfulness, prediction, liveweight gain, feed conversion efficiency, dressing percentage, pH, stress.

Phillips, W.A.; Brown, M.A.; Holloway, J.W.; Mayeux, H.S. (2002). **Animal performance and carcass quality of stocker calves on grass pasture with ad libitum access to a high energy diet.** *Journal of Dairy Science* 85 (Supplement 1): 228, ISSN: 0022-0302. **NAL Call Number:** 44.8 J822.

Keywords: beef cattle, stocker calf, wheat , forage crop, average daily gain, carcass quality, feedlot, pasture grazing, stocking rate, Texas, USA.

Prawl, Z.I.; Hill, W. J.; Owens, F.N.; Gill, D.R.; Ball, R.L.; Porter, R. (1997). **Effects of limited access time to feed on feedlot performance and carcass characteristics.** *Journal of Animal Science* 75 (SUPPL. 1): 239, ISSN: 0021-8812. **NAL Call Number:** 49 J82.

Keywords: steers, carcass characteristics, feed efficiency, feed, to gain ratio, feedlot performance, limited access time to feed, effects, feeding, behavior.

Purchas, R.W.; Burnham, D.L.; Morris, S.T. (2002). **Effects of growth potential and growth path on tenderness of beef longissimus muscle from bulls and steers.** *Journal of Animal Science* 80 (12): 3211-3221, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: breed, Angus, bull, steer, longissimus muscle, tenderness, carcass quality traits, growth potential, growth rates, meat quality.

Renand, G.; Havy, A.; Turin, F. (2002). **Beef traits and meat quality characterisation in three French beef production systems with Salers, Aubrac and Gascon bulls. [Caractérisation des aptitudes bouchères et qualités de la viande de trois systèmes de production de viande bovine à partir des races rustiques françaises Salers, Aubrac et Gasconne.]**

Productions Animales 15(3): 171-183, ISSN: 0990-0632.

NAL Call Number: SF1.P77

Keywords: bulls, beef cattle, animal husbandry methods, breeds, meat performance, meat texture, quality, performance, Europe, France, Western Europe, French language.

Renand, G.; Fisher, A.V. (1997). **Comparison of methods for estimating carcass fat content of young Charolais bulls in performance testing station. *Livestock Production Science* 51 (1/3): 205-213, ISSN: 0301-6226.**

NAL Call Number: SF1 L5.

Keywords: methodology, performance testing, genetics, Charolais, bulls, carcass composition, fat, analytical methods.

Restle, J.; Pascoal, L.L.; Faturi, C.; Alves Filho, D.C.; Brondani, I.L.; Pacheco, P.S.; Peixoto, L.A. de O. (2002). **Breed and heterosis effects on carcass quantitative traits of feedlots finished cull cows. [Efeito do grupo genético e da heterose nas características quantitativas da carne de vacas de descarte terminadas em confinamento.] *Revista Brasileira de Zootecnia* 31(1): 350-362, ISSN: 1516-3598.**

NAL Call Number: SF1 R45.

Keywords: beef cattle, carcasses, weight, hybrids, crossbreeding, feedlots, fattening, feeding, husbandry methods, bovidae, bovinæ, breeding methods, Portuguese language, Brazil.

Restle, J.; Grassi, C.; Feijo, G.L.D. (1996). **Carcass characteristics of beef cattle bulls or steers castrated with burdizzo or knife, under pasture conditions. [Características das carcaças e da carne de bovinos inteiros ou submetidos a duas formas de castração, em condições de pastagem.] *Revista da Sociedade Brasileira de Zootecnia* 25(2): 334-344, ISSN: 0100-4859.**

NAL Call Number: SF1 R45

Keywords: beef cattle, castration, carcasses, carcass composition, pastures, husbandry methods, Portuguese language, Brazil.

Riley, D.G.; Chase, C.C. Jr.; Hammond, A.C.; West, R.L.; Johnson, D.D.; Olson, T.A.; Coleman, S.W. (2002). **Estimated genetic parameters for carcass traits of Brahman cattle. *Journal of Animal Science* 80 (4): 955-962, ISSN: 0021-8812.**

NAL Call Number: 49 J82.

Keywords: breed, Brahman, carcass traits, estimated genetic parameters, carcass yield, feedlots, genetic parameters, yield performance.

Roeber, D.L.; Cannell, R.C.; Wailes, W.R.; Belk, K.E.; Scanga, J.A.; Sofos, J.N.; Cowman, G.L.; Smith, G.C.; et al (2002). **Frequencies of injection-site lesions in muscles from rounds of dairy and beef cow carcasses. *Journal of Dairy Science* 85 (3): 532-6, ISSN: 0022-0302.**

NAL Call Number: 44.8 J822.

Keywords: injection site lesions, muscle lesions, beef rounds, dairy rounds, educational programs, veterinary procedures, quality control.

Rossi, C.A.S.; Dell'Orto, V.; Baldi, A.; Morini, M. (1997). **Weight, breed, and type of disease affecting the recovery of unwell beef cattle after transportation.**[Peso, razza e tipo di patologia influenzano il recupero sanitario dei bovini da carne problema.] *Atti della Societa Italiana di Buiatria* 29: 191-198.

Keywords: stress, body weight, breeds, transport of animals, cattle diseases, Italian language.

Sally, E.; Crow, G.H. (1997). **Prediction of carcass merit for beef cattle breeding stock.** *Canadian Journal of Animal Science* 77 (3): 574-575, ISSN: 0008-3984.

NAL Call Number: 41.8 C163.

Keywords: British breeds, backfat, carcass merit, live weight, rib, eye area.

Santamaria, G.; Suarez, M.L.; Fidalgo, L.E.; Goicoa, A.; Suarez, C. Monserrat, L. (1996). **Assessment of the neuroendocrin response in beef calves submitted to usual preslaughter handling methods.** [Evaluacion de la respuesta neuroendocrina en terneros de carne sometidos a practicas de manejo habituales previas al sacrificio.] *Investigacion Agraria. Produccion y Sanidad Animales* 11(1): 59-66, ISSN: 0213-5035.

NAL Call Number: SF15 S7 A52.

Keywords: beef cattle calves, livestock management, slaughtering, stress, functional disorders, evaluation, Spanish language.

Schaefer, A.L.; Jones, S.D.M.; Stanley, R.W. (1997). **The use of electrolyte solution for reducing transport stress.** *Journal of Animal Science* 75 (1): 258-265, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: reviews, blood sugar, stress, dehydration, hypoglycemia, handling, metabolic disorders, etiology, treatment, transport of animals, animal welfare, electrolytes, fluid therapy, meat quality.

Sindt, J.J.; Drouillard, J.S.; Thippareddi, H.; Phebus, R.K.; Lambert, D.L.; Montgomery, S.P.; Farran, T.B.; LaBrune, H.J.; Higgins, J.J.; Ethington, R.T. (2002). **Evaluation of finishing performance, carcass characteristics, acid-resistant E. coli and total coliforms from steers fed combinations of wet corn gluten feed and steam-flaked corn.** *Journal of Animal Science* 80 (12): 3328-3335, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: Escherichia coli (Enterobacteriaceae), beef cattle crossbred steers, feces, rumen, total coliform count, finishing performance, carcass characteristics, dietary manipulations, finishing diets, pH, steam-flaked corn.

Smith, L.B.; Daley, C.A.; Cooley, C.L.; Early, A.M. (2002). **The effects of steroidogenic growth promotants on steer performance, carcass quality, tenderness, and intramuscular lipid content.** *Journal of Dairy Science* 85 (Supplement 1):129.

NAL Call Number: 44.8 J822.

Keywords: breed, Black Angus, crossbred, steer, 17-beta-estradiol, dosage, estrogen, growth stimulant, Compudose, Revalor-S, Synovex-S, growth stimulant, implant, conjugated linoleic acid, estrogen, growth stimulant drug, estradiol benzoate, Warner-Bratzler shear force value, average daily gain, carcass quality, intramuscular lipid content, meat tenderness.

Splan, R.K.; Cundiff, L.V.; Dikeman, M.E.; Van Vleck, L.D. (2002). **Estimates of parameters between direct and maternal genetic effects for weaning weight and direct genetic effects for carcass traits in crossbred cattle.** *Journal of Animal Science* 80 (12):3107-3111, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: crossbred beef cattle, consumer preferences, meat product, quality parameters, carcass traits, genetic effects, genetic correlations, estimates, maternal, weaning weights.

Steen, R.W.J.; Kilpatrick, D.J.; Porter, M.G. (2002). **Effects of the proportions of high or medium digestibility grass silage and concentrates in the diet of beef cattle on liveweight gain, carcass composition and fatty acid composition of muscle.** *Grass and Forage Science* 57 (3): 279-291, ISSN: 0142-5242.

NAL Call Number: 60.19 B773.

Keywords: beef, male, steer, muscle, fatty acid composition, muscular system, omega-3 polyunsaturated fatty acids, barley meal based concentrate, animal feed, carcass composition, concentrate supplementation, grass silage, high digestibility, medium digestibility, liveweight gain, soyabean meal based concentrate.

Steinhardt, M.; Thielscher, H.H. (1997). **Reaction patterns of suckler calves exposed to transport stress. [Reaktionsmuster von Saugkaelbern auf Transportbelastung.]** In: 3. *Trenthorster Kolloquium, Workshop on Rearing of Cattle with Suckler Calves (Mutterkuhhaltung) as Extensive Rearing System. Studies on Appropriate and Environmentally Friendly Animal Husbandry, Dec. 5-6, 1996 Trenthorst, Germany. [Workshop Ueber Die Haltung von Rindern Mit Saugkaelbern (Mutterkuhhaltung) Als Extensive Tierhaltungsform. Studien Zur Artgerechten Und Umweltfreundlichen Tierhaltung.]* FAL: Braunschweig-Voelkenrode, Germany, pp. 184-202, Series title, *Landbauforschung Voelkenrode. Sonderheft* (Germany), no. 177, ISSN: 0376-0723.

NAL Call Number: 18 L2353 Suppl.

Keywords: beef cattle calves, cows, mothers, dairy cows, transport of animals, behavior, animal welfare, animal health, blood composition, heart rate, body temperature, stress, Germany, European Union, German language.

Szucs, E.; Mezes, M.; Acs, I.; Barandi, Z.; Tran, A.T.; Abraham, M. (1996). **Relation of stress susceptibility to meat quality in beef cattle.** *Journal of Animal Science* 74 (SUPPL. 1): 167, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: ACTH, beef performance, biobusiness, cholesterol, drip loss, foods, free fatty acid, glucose, meat quality, meeting abstract, stress susceptibility.

Tipton, N.C.; Paschal, J.C.; et al. (1997). **Feedyard and carcass characteristics of Santa Gertrudis steers subject to seven different implant combinations.** *Journal of Animal Science* 75 (SUPPL. 1): 240, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: steers, Santa Gertrudis, breed, anabolic drugs, Revalor S, Synovex, S, average daily gain, carcass characteristics, feedyard characteristics, implant combination effects, steak, marbling, meat.

Vaz, F.N.; Restle, J.; Brondani, I.L.; Da Costa, E.C.; Vaz, R.Z.; Roso, C.; Carrilho, C.O. (2002). **Energetic supplementation on carcass and meat quality of cull cows of different ages, finished on cultivated winter pasture under temporary grazing. [Suplementacao**

energetica sobre a qualidade da carcaca e da carne de vacas de diferentes idades, terminadas em pastagem cultivada de estacao fria sob pastejo horario.] *Revista Brasileira de Zootecnia* 31(1): 173-182, ISSN: 1516-3598.

NAL Call Number: SF1 R45.

Keywords: ryegrass, forage crop, beef cattle, breed, Charolais, cow, carcass quality, meat quality, meat tenderness, pasture grazing, Portuguese language.

Vecerek, V.; Vecerkova, E (2000). **Animal protection and welfare of slaughter animals. [Ochrana a welfare jatecných zvířat]** *Veterinarství* 50(11): 454-456, ISSN: 0506-8231.

NAL Call Number: 41.8 V6439.

Keywords: animal welfare, legislation definitions, indicators, level of protection, slaughtering, meat production, environmental factors, European Union, Czech language, Czech Republic.

Villarroel, M.; Maria, G.A.; Sanudo, C.; Olleta, J.L.; Gebresenbet, G. (2003). **Effect of transport time on sensorial aspects of beef meat quality.** *Meat Science* 63 (3): 353-357, ISSN: 0309-1740.

NAL Call Number: TX373 M4.

Keywords: beef cattle, slaughter bulls, transport time effects, sensory panelist, longissimus dorsi thoracis analysis, consumer preferences, muscular system, tenderness, meat product, quality parameters, transport times.

Woodward, B.W.; Fernandez, M.I. (1999). **Comparison of conventional and organic beef production systems. II. Carcass characteristics.** *Livestock Production Science* 61(2/3): 225-231.

NAL Call Number: SF1 L5.

Keywords: organic farming, animal husbandry, evaluation, carcass composition, carcass quality, low input agriculture, feedlots, finishing, backfat, fat thickness, carcass weight, dressing percentage.

Zaman, M.S.; Mir, Z.; Mir, P.S.; El-Meadawy, A.; McAllister, T.A.; Cheng, K.J.; ZoBell, D.; Mathison, G.W. (2002). **Performance and carcass characteristics of beef cattle fed diets containing silage from intercropped barley and annual ryegrass.** *Animal Feed Science and Technology* 99 (1-4): 1-11, ISSN: 0377-8401.

NAL Call Number: SF95 A55.

Keywords: barley, ryegrass, animal performance, carcass characteristics, diet evaluation, feeding studies, dry matter yield, feed conversion efficiency.

Transport

Arthington, J.D.; Eicher, S.D.; Kunkle, W.E.; Martin, F.G. (2003). **Effect of transportation and commingling on the acute-phase protein response, growth, and feed intake of newly weaned beef calves.** *Journal of Animal Science* 81(5): 1120-1125, ISSN: 0021-8812.

NAL Call Number: 49 J82.

Abstract: The objective of this study was to investigate the effect of transportation and commingling on measures of the acute-phase protein response in newly weaned beef calves. Thirty-two (Exp. 1; average BW=266 plus or minus 20.8 kg) and thirty-six (Exp. 2; average BW=222 plus or minus 34.6 kg) Brahman-crossbred calves were randomly allotted to one of four treatments (2x2 factorial arrangement (transportation x commingling) in a completely randomized design). Body weight and jugular blood were collected at weaning, after shipment, and 1, 3, and 7 d after transport for Exp. 1, and at weaning and 1, 5, 9, 13, 17, and 21 d after transport for Exp. 2. Feed intake within pen was recorded daily for Exp. 2. Plasma fibrinogen, ceruloplasmin, haptoglobin, and cortisol concentrations were determined for all collection times. Additionally, serum amyloid-A and alpha -acid glycoprotein concentrations were determined in Exp. 1 and 2, respectively. In Exp. 2, commingled calves tended ($P=0.13$) to have a higher DMI than noncommingled calves (5.3 and 4.8 kg/d, respectively). Transported calves lost more BW than nontransported calves from the time of weaning to d 1 (2.0 and 3.1% more BW loss for Exp. 1 and 2, respectively). With the exception of haptoglobin in Exp. 1, each of the acute-phase proteins measured in these studies increased over each sampling day. In Exp. 1, transported calves had higher ($P<0.05$) mean serum amyloid-A concentrations than nontransported calves (48.9 vs. 33.4 micro g/mL). There was a significant sampling day x transportation interaction ($P<0.01$) for fibrinogen, ceruloplasmin, and haptoglobin in Exp. 1; transported calves had higher concentrations of fibrinogen following transport and on d 2 and 3, and ceruloplasmin on d 3. Haptoglobin concentrations were higher ($P=0.04$) in nontransported calves on d 1 and 2 of Exp. 1. In Exp. 2, overall mean haptoglobin concentrations were higher in nontransported vs. transported calves. The results of these studies indicate that stressors associated with transportation affect the acute-phase protein response in newly weaned beef calves. More research is needed to determine whether these proteins might be valuable indicators of stress following the weaning process.

Keywords: beef cattle, acute phase proteins, blood chemistry, body weight, calves, ceruloplasmin, feed intake, fibrinogen, growth rate, haptoglobins, interactions, stress response, transport of animals.

Barham, A.R.; Barham, B.L.; Johnson, A.K.; Allen, D.M.; Blanton, J.R., Jr.; Miller, M.F. (2002). **Effects of the transportation of beef cattle from the feedyard to the packing plant on prevalence levels of Escherichia coli O157 and Salmonella spp.** *Journal of Food Protection* 65 (2): 280-283, ISSN: 0362-028X.

NAL Call Number: 44.8 J824.

Abstract: Two hundred steers and heifers from a large feedyard (65 000-head capacity) were used to determine the prevalence levels of enterohaemorrhagic Escherichia coli O157 (EHEC O157) and Salmonella spp. prior to and after shipping to a commercial packing facility. Two samples, a ventral midline hide swab and a faecal sample, were aseptically collected from each animal 2 weeks prior to the date of transportation and at the packing plant immediately after exsanguination. Samples were collected from all trailers (n=46) before animals were loaded for transport to the packing facility. The average prevalence levels of EHEC O157 on hides (18%) and in faeces (9.5%) at the feedyard decreased ($P>0.05$) at the packing plant to

4.5 and 5.5%, respectively. The average prevalence levels of *Salmonella* spp. on hides (6%) and in faeces (18%) at the feedyard increased to 89 and 46%, respectively, upon arrival at the packing plant. Average prevalence levels for EHEC O157 and *Salmonella* spp. on the trailers were 5.43 and 59%, respectively. The results of this study demonstrate that transportation may be a potential stressor for cattle, as evidenced by the increased shedding of *Salmonella* spp.

Keywords: beef cattle, heifers, steers, disease prevalence, feces, food contamination, food safety, foodborne diseases, *Escherichia coli*, *Salmonella*, hides, skins, stress factors, transport of animals. Copyright© 2003, CAB International

Beach, J.C.; Murano, E.A.; Acuff, G.R.; et al. (2002). **Prevalence of *Salmonella* and *Campylobacter* in beef cattle from transport to slaughter.** *Journal of Food Protection* 65 (11): 1687-93, ISSN 0362-028X.

NAL Call Number: 44.8 J824.

Abstract: The objective of this study was to evaluate the effect of typical production practices during the transport of cattle on the resulting incidence of *Salmonella* and *Campylobacter* in the feces, on the hides, and on the carcasses of these cattle and in the environment (trucks, holding pens, and knock boxes). Various factors were evaluated, including the type of animal (feedlot cattle vs. adult pasture cattle), the breed of cattle, the body condition of the animal, the age of the animal, the time of feed and water withdrawal, the contamination level of the transport vehicle at the feedlot or farm, the transport time, the time cattle were held in the holding pen at the plant, and the contamination level of the holding pen. Four groups of each type of animal were sampled on different days. Samples were collected from cattle prior to transport and after transport (rectal and hide swabs) as well as from the carcasses of these cattle. Pre- and posttransit samples were also taken from the transport vehicle and from the holding pen and knock box at the slaughter facility. For feedlot cattle, fecal shedding stayed fairly constant for both organisms before and after transport (3 to 5% for *Salmonella* and 64 to 68% for *Campylobacter*). However, the shedding rate for adult cattle increased from 1 to 21% for *Salmonella* but stayed constant for *Campylobacter* (6 to 7%). Contamination of hides with *Salmonella* increased for both animal types from a level of 18 to 20% to a level 50 to 56%. For *Campylobacter*, the contamination level decreased from 25 to 13% for feedlot cattle but remained unchanged for adult animals (1 to 2%). Nineteen percent of feedlot cattle carcasses and 54% of adult cattle carcasses tested positive for *Salmonella*, while only 2% of feedlot cattle carcasses and none of the adult cattle carcasses tested positive for *Campylobacter*. Thus, for feedlot cattle, the factors considered in this study did not affect the shedding of either organism but did affect the contamination of hides with both. For adult animals, the factors increased both shedding of and hide contamination with *Salmonella* only, not *Campylobacter*.

Keywords: campylobacter, salmonella, isolation and purification, food contamination, abattoirs, feces, transport of cattle.

Booth, M.E.; SchwartzkopfGenswein, K.S.; McAllister, T.A.; Mears, G.J.; Schaefer, A.L.; Cook, N.; Church, J.S.; Crews, D.H. Jr. (2002). **Effects of pre-haul management and transport distance on beef calf performance and welfare.** *Journal of Dairy Science* 85 (Supplement 1): 27, ISSN: 0022-0302.

NAL Call Number: 44.8 J822.

Keywords: calf, steer, animal welfare, average daily gain, dry matter intake, feedlot, growth performance, heart rate, morbidity, preconditioning, stress, transport distance.

Dell'Orto, V.; Rossi, C.A.S. (1998). **The adaptation phase in replacement beef cattle. [La fase di adattamento del bovino da carne da ristallo.]** *Informatore Agrario* 54(40): 35-53, ISSN: 0020-0689.

NAL Call Number: 281.8 IN32.

Keywords: livestock transporters, transport, nutritional state, new environment, stress, minerals, energy balance, immune response, feeding, systems, transport of animals, Italian language, Italy.

Duff, G.C.; Walker, D.A.; Malcolm-Callis, K.J.; Wiseman, M.W.; Hallford, D.M. (2000).

Effects of preshipping vs. arrival medication with tilmicosin phosphate and feeding chlortetracycline on health and performance of newly received beef cattle. *Journal of Animal Science* 78(2): 267-74. ISSN: 0021-8812.

NAL Call Number: 49 J82.

Keywords: beef calves, feedlot, tilmicosin phosphate, feeding chlortetracycline, health, average daily gain, daily dry matter intake, bovine respiratory disease (BRD).

Gallo, C.; Lizondo, G.; Knowles, T.G. (2003). **Effects of journey and lairage time on steers transported to slaughter in Chile.** *Veterinary Record* 152(12): 361-364. ISSN: 0042-4900.

NAL Call Number: SF601 I4.

Abstract: Steers representative of the most common type, weight, and conformation slaughtered in Chile (between December 1999 and January 2000) were transported for either 3 or 16 h and held in lairage for 3, 6, 12, or 24 h. Measurements of liveweight, carcass weight, and postmortem pH and colour of muscle were made to assess the economic and welfare effects of the different transport and lairage times. Compared with the short journey, the longer journey was associated with a mean (se) reduction in liveweight of 8.5 (2.8) kg, which was further decreased by 0.42 (0.18) kg for every hour that the animals were kept in lairage after 16 h of transport, an increase in final muscle pH, a decrease in muscle luminosity, and an increase in the proportion of carcasses downgraded because they were classified as dark cutting. The carcass weights also tended to be lower after the longer journey and after longer periods in lairage.

Keywords: steers, animal welfare, beef quality, carcass quality, carcass weight, carcasses, color, liveweight, pH, stress, transport of animals, Chile. Copyright© 2003, CAB International

Grandin, T. (1999). **Easy tips for low stress cattle handling.** *Large Animal Practice* 20 (5): 28, 30-33.

NAL Call Number: SF601 B6.

Keywords: beef cattle, dairy cattle, handling, transport, stress, trauma, milk, milking, reproduction, techniques, immune response.

Lambert, M.G.; Knight, T.W.; Cosgrove, G.P.; Death, A.F.; Anderson, C.B. (2000). **Effects of yarding and transport on muscle glycogen concentration in beef cattle.** *Proceedings of the New Zealand Society of Animal Production* 60: 124-125, ISSN: 0370-2731.

NAL Call Number: 49.9 N483.

Keywords: glycogen, muscles, pH, beef, meat quality, stress, animal husbandry, transport of animals, handling.

Villarroel, M.; Maria, G.A.; Sanudo, C.; Olleta, J.L.; Gebresenbet, G. (2003). **Effect of transport time on sensorial aspects of beef meat quality.** *Meat Science* 63 (3): 353-357, ISSN: 0309-1740.

NAL Call Number: TX373 M4.

Keywords: beef cattle, slaughter bulls, transport time effects, sensory panelist, longissimus dorsi thoracis analysis, consumer preferences, muscular system, tenderness, meat product, quality parameters, transport times.

Villarroel, M.; Maria, G.A.; Sierra, I.; Sanudo, C.; Garcia-Belenguer, S.; Gebresenbet, G. (2001). **Critical points in the transport of cattle to slaughter in Spain that may compromise the animals' welfare.** *Veterinary Record* 149(6): 173-176, ISSN: 0042-4900.

NAL Call Number: SF601 I4.

Abstract: The welfare of cattle depends greatly on the attitudes and training of stockpersons and on the availability of appropriate facilities. Much has been learned about stress during transport, but less attention has been paid to identifying and correcting critical points, partly because these vary widely both nationally and internationally. A survey of cattle transport in Spain was made in an effort to determine which parts of the process most compromised the welfare of the animals. Data were collected on the methods and facilities for loading and unloading, transport times, types of vehicle and slaughter house practices. Loading facilities were adequate and loading times generally short, but some farms continued to use an electric goad and weather-proofing was generally poor. The average journey time within Spain was three-and-a-half hours, but many trips were made abroad (especially to Italy), few drivers received specific training courses and the types and quality of vehicles varied widely. The average unloading time was very short but the animals were not always inspected for injuries or dirtiness. Lairage times were normally more than 8 h but few slaughter houses had air conditioning equipment to prevent excessive heat or dehydration. Almost all stockpersons avoided either regrouping animals, or housing or transporting animals at high densities.

Keywords: animal husbandry, animal welfare, attitudes and training of stock persons, survey data, methods and facilities for loading and unloading, transport times, types of vehicle, slaughterhouse practices, electric goad, stocking density, stress factors, transport of animals, injuries, cleanliness, Spain. Copyright© 2003, CAB International

Whiting, T. L. (2000). **Comparison of minimum space allowance standards for transportation of cattle by road from 8 authorities.** *Canadian Veterinary Journal* 41(11): 855-860, ISSN: 0008-5286.

NAL Call Number: 41.8 R3224.

Abstract: Space allowance for animals in transit is a consistent concern in many countries developing codes of practice and regulations to assure humane treatment of food producing animals. Describing minimum space allowance requirements for cattle in transit has proven to be difficult, as the space required increases as the animal grows. Loading pressure, defined as weight of live animal per unit area, has proven to be a clear method of communicating with transporters and inspection staff what the maximum safe stocking limit is based on individual animal weight. The loading density recommendations in the Canadian code of practice for beef cattle are compared with other standards by using loading pressure charts as a visual aid. Loading pressure charts are recommended in preference to a tabular format to describe the minimal space allowed per animal for cattle transported by road.

Keywords: transport of animals, road transport, animal welfare, legislation, codes of practice, minimal space allowance, loading density, Canada. Copyright© 2003, CAB International

Website Resources

Website addresses change periodically. The sites listed are current as of August 2004. Emphasis was placed on selecting resources relevant to the care and welfare of beef cattle.

ADDs Program: Agricultural Databases for Decision Support

<http://www.adds.org/>

Comprehensive electronic collections of peer-reviewed and expert-selected educational materials, lists, and software tools, developed to support decision making by the Nation's farmers, ranchers, growers and forest land owners, and by those who work with them in an educational, consultative, or service capacity. Databases are available/ or in progress for dairy, beef, goat, sheep, and swine. Collections are distributed via CD-ROM and the World Wide Web.

Agri INFO

<http://cgilnt.aps.uoguelph.ca/>

Agri INFO is the largest Canadian collection of technical publications related to beef, dairy and maple production. The Canadian Dairy Extension Committee, Canadian Farm Business Management Council, and the Ontario Cattlemen's Association jointly sponsor the site.

Agriculture and Agri-food Canada

http://www.agr.gc.ca/index_e.phtml

Agriculture and Agri-Food Canada provides information, research and technology, and policies and programs to achieve security of the food system, health of the environment and innovation for growth. Abstracts available from "The Lennoxville Symposium on Farm Animal Welfare in Canada: New technologies, research and world trade."

Alberta Farm Animal Care (AFAC) Association

<http://afac.ab.ca>

AFAC is an association started by farmers. AFAC's goal is to promote responsible animal care and enhance public understanding of Alberta's animal agriculture. AFAC participates in issues and legislation that encourage research into relevant to animal care. Website contains Farm Animal Welfare News, a publication that contains current information on farm animal welfare initiatives, relevant issues, and research conducted in Canada. Links to reports, codes of practice, legislative information, and information on training courses on handling and transport of swine, cattle, and horses.

Alternative Farming: An Annotated Database

<http://www.awionline.org/farm/altfrm.htm>

Searchable database containing farmers' profiles and case studies, useful hints and guides, research articles, book chapters, books and web sites. Coverage includes articles on cattle, pig, poultry, sheep and goat grass-based farming; rotational grazing; deep-litter and outdoor systems; pasture; grassland management; sustainable agriculture; principles of low-stress livestock handling; animal behavior; predator-friendly farming, etc. Emphasis on methods that encourage species specific behavior and conservation of the environment.

American Association of Bovine Practitioners

<http://www.aabp.org/>

The American Association of Bovine Practitioners is an international association of veterinarians organized to enhance the professional lives of its members through relevant continuing education that will improve the well-being of cattle and the economic success of their owners, increase awareness and promote leadership for issues critical to cattle industries, and improve opportunities for careers in bovine medicine. The association site provides extensive links to online resources including the Dairy Quality Assurance (DQA) Center which has many resources available to producers, milk handlers, veterinarians, and other members of the dairy industry who want to foster the well-being of dairy animals. The Caring for Dairy Animals Technical Reference Guide and the companion On-Farm Self-Evaluation Guide have been compiled for a wide audience, including researchers, students, the press, veterinarians, and, of course, milk and dairy producers.

Animal Well-Being and Stress Control Systems

<http://www.ars.usda.gov/research/programs.htm>

The Agricultural Research Service (ARS) is the principal research agency of the U.S. Department of Agriculture. ARS is charged with extending the Nation's scientific knowledge across a broad range of program areas. This Website describes ARS research initiatives in the area of farm animal well-being and stress.

Animal Welfare Information Center (AWIC)

<http://www.nal.usda.gov/awic/>

National Agricultural Library 10301 Baltimore Ave. Beltsville, MD 20705 Tel: (301) 504-6212, Fax: (301) 504-7125, E-mail: awic@nal.usda.gov

The Animal Welfare Information Center (AWIC) located at the U.S. Department of Agriculture's National Agricultural Library provides reference services primarily for patrons using animals covered by the Animal Welfare Act. Farm animals used in teaching, testing, and non production oriented research, are covered by the Act. AWIC produces bibliographies on the welfare and husbandry of swine, cattle, horses, sheep, poultry, dogs, cats, rabbits, and rodents. The Animal Welfare Information Center Bulletin contains several articles on agricultural animal care and use including anesthesia, analgesia, animal transport, and animal welfare issues. The AWIC Website includes these documents. The site also contains links to US farm animal policies, guidelines, and congressional activity.

Animal Welfare and Behavior Group at Michigan State

<http://www.msu.edu/~zanella/current.html>

Description of current research projects of the Animal Welfare and Behavior Group at Michigan State. Projects include studies on memory and learning in pigs, and a novel animal welfare training program patterned after traditional animal judging teams. The program offers students the opportunity to assess the welfare of animals maintained under different housing, husbandry and environmental conditions.

Animal Welfare and Beef Cattle Feedlots

<http://www.dpi.qld.gov.au/beef/6942.html>

This fact sheet reviews important management considerations for beef cattle raised in feedlots including: humane handling, human animal interactions, facility design, mixing cattle, adverse environmental conditions (i.e. hot weather, dusty yards, boggy conditions), nutrition, and health.

Dehorning Beef Cattle Via Genetics is Welfare Friendly

<http://www.usask.ca/wcvm/herdmed/applied-ethology/articles/dehorn.html>

Recommendations from the Expert Committee on Farm Animal Welfare and Behaviour, on Promoting the use of Polled Sires within the Beef Industry in Canada. Background information on the advantages of using genetics over mechanical and chemical dehorning in beef cattle are presented.

Animal Welfare: Ministry of Agriculture and Forestry (MAF) New Zealand

<http://202.78.129.207/biosecurity/animal-welfare/codes/index.htm>

Full text Codes of Recommendations and Minimum Standards for livestock and other species are available at this site. Humane treatment of livestock during transport, slaughter, and sale yards covered.

Animal Health and Welfare

<http://www.defra.gov.uk/animalh/animindx.htm>

The health and welfare of animals are central to Department for Environment, Food and Rural Affairs (DEFRA) work of protecting and improving livestock and controlling and eradicating disease. The Animal Health and Welfare pages are divided into various subject areas including: BSE, Tuberculosis, Identification, Animal Welfare, International Trade, Disease surveillance and control. Links available to a number of documents focusing on cattle welfare.

Annotated Database on Refinement of Housing and Handling Conditions and Environmental Enrichment for Laboratory Animals. Part II: Cattle, Calves, Chickens, Goats, Horses, Quails, Pigs, Sheep

http://www.awionline.org/Lab_animals/biblio/refine.htm

An annotated database of articles, abstracts, book chapters, and books, on all aspects of refinement and environmental enrichment are available at this site. Housing and handling of farm animals is included. The database is regularly updated.

Arizona Ranchers Management Guide

<http://ag.arizona.edu/arec/pubs/rmg/ranchers.html>

Revised and expanded in 2002 this guide is designed to be an information resource for Arizona ranchers. The guide contains extension-developed information on a wide range of issues related to Arizona ranch management. Subject coverage includes: identifying poisonous plants, diseases of beef cattle, feeding in drought conditions, rangeland management systems, marketing, and more.

Beef Cattle @ TAMU

<http://animalscience.tamu.edu/ansc/index.htm>

Provided by the Department of Animal Science at Texas A&M University the Online Beef Information Center contains publications and information about a beef cattle and beef cattle management. Topics include information on reproduction, quality assurance, facilities, genetics, health, nutrition, and more.

Beef Cattle Handbook on CD-ROM

<http://www.mwpsHQ.org/beefcd.html>

Information on ordering the 1999 version of the The Beef Cattle Handbook, developed under the auspices of the Beef Cattle Resource Committee of the North Central Land Grant Universities. The CD contains 145 articles and extension bulletins in PDF format. The materials cover reproduction; agribusiness and business management; nutrition; production management; quality assurance and carcass and end products; health and entomology; facilities and equipment; environmental stewardship; pasture, range, and forage management; and breeding and genetics.

Beef Cattle Resources

<http://www.ansi.okstate.edu/library/cattbeef.html>

Maintained by the staff of the Animal Science Department at Oklahoma State, this site features an extensive listing of web links for various breed associations, bull test stations, herd health, reproduction, husbandry, and beef cattle nutrition information.

Animal Welfare Guidelines For Beef Farms

<http://www.teagasc.ie/publications/2003/animalwelfareguidelines.htm>

Basic welfare guidelines geared toward producers raising beef cattle in Ireland are presented. Good stockmanship, husbandry, veterinary procedures, facilities, feeding, transport, and animal welfare legislation are reviewed.

Budd Williams Stockmanship School: Teaching Low Stress Livestock Handling Methods

<http://www.stockmanship.com/>

Stress is an important component of livestock health problems and effectively limits performance. Sources of stress include shipping, weaning, acclimation to new surroundings, processing, pen riding, treating and sorting. People can be trained in stockmanship and management techniques that eliminate stress during these procedures and, in fact, make handling episodes positive to performance, quality and animal welfare. Budd Williams has spent a life time perfecting these techniques and now offers training classes in his unique handling methods.

Canadian Agri-Food Research Council (CARC)

http://www.carc-crac.ca/english/codes_of_practice/index.htm

This site provides fact sheets summarizing Canadian Recommended Codes of Practice, for pigs, dairy cattle, veal calves, and other livestock. Proceedings from the Farm Animal Welfare Challenge 2000 Workshop are available at this site in PDF format.

Clemson Beef Cattle Information Database

<http://www.clemson.edu/edisto/beef-db/beef-db.htm>

Database contains links to extension educational materials on beef cattle breeding and genetics, reproduction, body condition scoring, pastures and forages, health, management, and handling facilities.

Colonel K.L. Campbell Centre for the Study of Animal Welfare

<http://www.aps.uoguelph.ca/%7Ecsaw/CSAW1.htm>

Located at the University of Guelph, the Centre's mission is to promote the welfare of animals through research and education. Research projects focus on: alternatives for the use of animals in teaching; assessing animal well being; enriching the lives of laboratory animals; ethical issues of animal use; animal breeding and genetic engineering; humane husbandry systems alleviating animal suffering; and relationships between animals and people.

Combined Livestock Issues Database Information

<http://www.liru.asft.ttu.edu/refman/index.htm>

A reference database compiled for farm animal researchers and educators. The database provides references on contemporary issues in animal agriculture.

Companion Animals and Livestock: Beef

<http://www.agric.nsw.gov.au/reader/beef>

This site is provided by New South Wales Department of Agriculture. Beef pages contain information on health, nutrition, drought, herd management, quality assurance, and facilities.

Cooperative State Research Education and Extension Service (CSREES) Home Page

<http://www.reeusda.gov/>

CSREES link the research and education programs of the U.S. Department of Agriculture and works with land-grant institutions in each state, territory and the District of Columbia. The mission of CSREES is in cooperation with partners and customers, to advance a global system of research, extension and higher education in the food and agricultural sciences and related environmental and human sciences to benefit people, communities, and the Nation. A clickable map of extension programs by state is available at:

http://www.csrees.usda.gov/qlinks/partners/state_partners.html

Beef producers are encouraged to use this site to locate extension materials that are specific to their state's climatic conditions, types of housing, feed resources, etc.

Cow-Calf Corner

<http://www.ansi.okstate.edu/exten/cc-corner/archive.htm>

Extension site covering a wide range of topics regarding beef cow-calf management. Topics covered include estrus synchronization, pregnancy checking, calving time management, cow herd health, bull management, nutrition, and more.

Determining the Condition of Beef Cattle

<http://www.raa.nsw.gov.au/reader/1749>

A series of photographs of beef cattle with fat scores ranging from 1-4 is presented. Fat scores are discussed in relationship to their impact on cattle welfare.

Dr. Temple Grandin's Web Page

<http://www.grandin.com/>

Full text, abstracts, reviews, and general information based on or related to the work of applied ethologist Temple Grandin. Topics include livestock behavior, design of stockyards and restraining systems, humane and ritual slaughter, stress and meat quality, current research, animal welfare/rights, and books. A fact sheet entitled "Critical Control Points on Feedlots, Ranches, and Stocker Operations" provides beef producers with tips on proper management practices to ensure optimal cattle welfare.

Effects of Body Condition on Productivity

<http://edis.ifas.ufl.edu/AN004>

Body condition can be used by cattle producers to make management decisions. Decisions about grouping cattle and the type and level of supplemental feed for maximum profit should take into consideration body condition. This publication reviews the relationship of body

condition to productivity, provides pictures of beef cattle representative of different body condition scores (BCS), and gives examples of how body condition can be used to help in making herd management decisions.

Encyclopedia of Farm Animal Behavior (EFAB)

<http://www.liru.asft.ttu.edu/EFAB/default.asp>

This online encyclopedia containing audio and video clips of farm animals exhibiting various behaviors, is intended for research and teaching purposes. The encyclopedia is provided by the USDA, ARS, Southern Plains Area, Livestock Issues Research Unit, and Multimedia Division.

European Commission on Animal Welfare

http://europa.eu.int/comm/food/animal/index_en.htm

The European Commission's activities on animal welfare recognize that animals are sentient beings. The Directorate General for Health and Consumer Protection is responsible for setting standards for the welfare of animals on the farm, during transport and at slaughter. Links are available to animal welfare policy objectives, legislative action, ongoing initiatives, and international animal welfare issues.

Healthy Animals

<http://www.ars.usda.gov/is/np/ha/>

The Healthy Animals Website offers an online compilation of animal health related research news. The site is maintained by the U.S. Department of Agriculture's chief scientific agency, the Agricultural Research Service.

Libraries on the Web

http://sunsite.berkeley.edu/Libweb/Public_main.html

This is a great way to locate library resources near your home or farm. Your local librarian can assist you in borrowing training materials from state libraries and/or the National Agricultural Library (NAL). However, not all local libraries have web pages. For libraries not listed check your local telephone directly.

National Institute for Animal Agriculture (NIAA)

<http://www.animalagriculture.org>

The National Institute for Animal Agriculture (NIAA) is an umbrella organization of producers, veterinarians, processors, corporations, and commodity organizations that advocate programs that improve animal health, care, and food safety. NIAA produces educational videos and pamphlets on animal care, behavior, handling, transportation, and disease. Authors include animal scientists working in academic research institutions and commercial production facilities. Videos, pamphlets, and meeting proceedings may be ordered directly from NIAA.

NetVet

<http://netvet.wustl.edu/vet.htm>

NetVet focuses on veterinary resources with links to veterinary education, listservs, organizations, publications, and images. This award-winning site is an excellent starting point for looking for materials for training personnel in care and use of agricultural animals. A useful feature of NetVet is the Electronic Zoo. Among the Electronic Zoo animal group icons are horses, cows, pigs, small ruminants, and birds. Each icon contains a list of Websites related to these species.

Ohio Agricultural Education WWW Server

<http://www-cms.ag.ohio-state.edu/Home.html>

This server provides ordering and pricing information for Learning Laboratory Kits, interactive CDs, books, videos, and brochures. Subject coverage includes quality assurance, animal care, welfare, and handling, of beef, dairy, swine, goats, sheep, rabbits, and dogs. Teaching materials for FFA projects are listed as well.

Oklahoma State University, Department of Animal Science Web Page

<http://www.ansi.okstate.edu>

This is a quality Website containing sections covering breeds of livestock, free ration formulation software, extension publications, youth instructional materials, and more.

Ontario, Canada, Ministry of Agriculture, Food and Rural Affairs, Livestock Web Page

<http://www.gov.on.ca/OMAFRA/english/livestock/>

Web pages are available for dairy, beef, swine, goats, and alternative livestock. The swine page includes information on animal welfare, housing, health, genetics, reproduction, and more.

The International Veterinary Information Service (IVIS)

<http://www.ivis.org>

A not-for-profit organization created to provide clinically relevant, up-to-date information to veterinary practitioners, veterinary students, clinicians and researchers worldwide using the internet. The IVIS Website allows users free access to original, electronic textbooks, reviews, updates, and other resources on a wide variety of veterinary topics. All publications are original contributions written specifically for the IVIS Website and reviewed by the editor(s) of the book. Each book includes links to information about relevant medications. Book chapters can be printed on a desktop printer for easy reading. Veterinary related information available for farm, laboratory, companion, and exotic animal species.

USDA APHIS Veterinary Services (VS) Centers for Epidemiology and Animal Health (CEAH)

<http://www.aphis.usda.gov/vs/ceah/cahm/>

Information on bio security strategies for farms. E coli, Salmonella and other disease pathogens covered.

Welfare of Cattle Kept for Beef Production

http://www.europa.eu.int/comm/food/fs/sc/scah/out54_en.pdf

This is a report of the Scientific Committee on Animal Health and Animal Welfare, and was adopted in April 2001. This report discusses the welfare of cattle kept for beef production and topics covered include definitions and assessment of animal welfare, production zones in the European Union, beef production systems, cattle fattening systems, housing systems, behavior of cattle, effect of housing on the welfare of animals, and the effects of management on cattle welfare. This 150 page document is in PDF, which requires.

Welfare of Cattle and Calves

<http://www.defra.gov.uk/animalh/welfare/farmed/cattle/>

An overview of legislation and “welfare codes” pertaining to cattle raised in Europe. Bulletins in PDF format available on: calf survival, condition scoring, lameness, and the 2003 Code of Recommendations for Livestock: Cattle.

XPLOR, University of Missouri, Cooperative Extension: Beef Publications

<http://muextension.missouri.edu/explore/agguides/ansci/beef.htm>

This site contains fact sheets and abstracts relating to beef breeding, feeding, health, and management.

National Agricultural Library Document Delivery Information

Services Available to Individuals

The National Agricultural Library (NAL) supplies agricultural materials not found elsewhere to other libraries and information centers. Submit requests **first to your local library resources**. In the United States, possible sources are public libraries, state libraries, land-grant university or other large research libraries within a state. In other countries submit requests through major university, national, or provincial institutions.

If the publications are not available from these sources, have your library submit requests to NAL with a statement indicating their non-availability. Submit one request per page following the information below.

Information for the Library (The following information is provided to assist your librarian in obtaining the required materials.)

Interlibrary Loan Service -- Photocopies are available on interlibrary loan for a fee. Submit a separate interlibrary loan form or request for each item. If the citation is from an NAL database (AGRICOLA, *Bibliography of Agriculture*, or the NAL Catalog) and the call number is given, please include it. Willingness to pay charges must be indicated on the form. Materials in NAL's collection are loaned only to other U.S. and Canadian libraries. The following materials are not loaned: serials; rare, reference, and reserve books; microforms; and proceedings of conferences or symposia. Photocopy or microform of non-circulating publications may be requested for a fee provided that the request does not exceed 50 pages per item. Request must also include copyright compliance -- Pre-printed forms must contain your signature to indicate copyright compliance. On e-mail requests include the complete Statement of Copyright Compliance ("I have read the warning on copyright restrictions and accept full responsibility for compliance."), **your full name, date, and telephone number in each request**. Libraries may indicate compliance by including the initials of one statement, either "CCL" for compliance with the copyright law or "CCG" for compliance with Copyright Guidelines or a statement that the request complies with U.S. Copyright Law or other acceptable copyright laws (i.e. IFLA, CLA, etc.). Libraries must also provide authorizing official's name. Requests will be rejected if this information is not included.

Charges:

- Photocopy from paper, or paper copy of microfilm and microfiche for domestic delivery - \$13.00 up to 50 pages. Photocopy from paper, or paper copy of microfilm and microfiche for international delivery -- \$16.00 up to 50 pages. (International delivery via Internet is \$13.00.)
- Duplication of NAL-owned microfilm -- \$20.00 per reel
- Duplication of NAL-owned microfiche -- \$13.00 for each 5 fiche

Billing -- Charges include postage and handling, and are subject to change. Invoices are issued quarterly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. Phone: (703) 605-6640. Establishing a deposit account with NTIS is encouraged. **DO NOT SEND PREPAYMENT.**

Send Requests to:

USDA, National Agricultural Library
Document Delivery Services Branch, PhotoLab
10301 Baltimore Ave., NAL Bldg.
Beltsville, Maryland 20705-2351

FAX: 301-504-5675
Ariel IP address: ariel.nal.usda.gov
E-mail: lending@nal.usda.gov

Contact the Access Services, Document Delivery Services Branch at (301) 504-6503 or via Internet at access@nal.usda.gov with questions or comments about this policy.

Services Available to Libraries, Institutions and Organizations

The National Agricultural Library (NAL) accepts requests from libraries and other organizations in accordance with the national and international interlibrary loan code and guidelines. In its national role, NAL supplies copies of agricultural materials not found elsewhere. Submit requests to major university libraries, national or provincial institutions or network sources prior to sending requests to NAL. If the needed publications are not available from these sources, submit requests to NAL with a statement indicating their non-availability.

Materials in NAL's collection are not loaned outside the United States; however, copies of materials may be provided. There is a limit of 50 pages per item to comply with copyright law.

AGLINET -- Requesters in countries with an AGLINET library are encouraged to make full use of that library and its networking capabilities. As an AGLINET participant, NAL provides free document delivery service for materials published in the United States to other AGLINET participants.

Requests -- Submit requests on the American Library Association (ALA) or the International Federation of Library Associations and Institutions (IFLA) interlibrary loan form, or via electronic mail, Ariel™, or facsimile. (See further details under *For Electronic Access and Delivery* below.)

Charges:

- Photocopy, paper copy of microfilm and microfiche – \$13.00 up to 50 pages if mailed to domestic address. \$16.00 if mailed to international address. \$13.00 if sent via Internet.
- Duplication of NAL-owned microfilm—\$20.00 per reel
- Duplication of NAL-owned microfiche—\$13.00 for each 5 fiche or portion thereof
- Loans – \$15.00 per loan

Billing -- Charges include postage and handling, and are subject to change. Invoices are issued quarterly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. Phone: (703) 605-6640. Establishing deposit accounts with NTIS is encouraged. Annual billing is available on request by contacting NAL at the address below. **DO NOT SEND PREPAYMENT.** You will be invoiced.

For postal service delivery send requests to: USDA National Agricultural Library
PhotoLab
Document Delivery Services Branch
10301 Baltimore Ave., NAL Bldg.
Beltsville, Maryland 20705-2351

For electronic access and delivery :

The Document Delivery Services Branch accepts ILL requests from libraries via several electronic methods. All requests must comply with established routing and referral policies and procedures. A sample format for ILL requests follows.

INTERNET.....lending@nal.usda.gov

Start the subject line with one word format:

3 letter month abbreviation + day + NAL + # of request placed that day,
For Example: jul25NAL4 (if this is the fourth request on July 25).
For Example: jul 25NAL1-4 (if this is four requests submitted at one time)

OCLC.....AGL

TELEFACSIMILE.....301-504-5675

Requests can be created on standard ILL forms and then faxed. NAL will fill via FAX at no additional cost if FAX number is included on request. NAL will send up to 30 pages per article. If request exceeds 30 pages, NAL will ship via postal service. There is no RUSH service.

ARIEL™ariel.nal.usda.gov

NAL will fill the request via ARIEL™ if the ARIEL™ address is included in the request. NAL treats ARIEL™ at an alternative delivery mechanism--not an expedited service. NAL will send up to 30 pages per article via ARIEL™. If request exceeds 30 pages, NAL will ship via postal service.

Required data elements for all requests:

- Complete mailing information for all requests regardless of method of delivery. (Borrower's Fax number or ARIEL™ IP address if delivery by either of these methods is desired.)
- Complete citation including verification (source of citation) and NAL call number if available.
- Date after which item is no longer needed.
- Copyright Compliance -- Pre-printed forms must contain your signature to indicate copyright compliance. On e-mail requests include the complete Statement of Copyright Compliance. Libraries may indicate compliance by including the initials of one statement, either "CCL" for compliance with the copyright law or "CCG" for compliance with Copyright Guidelines or a statement that the request complies with U.S. Copyright Law or other acceptable copyright laws (i.e. IFLA, CLA, etc.). Libraries must also provide authorizing official's name. Requests will be rejected if this information is not included.
- Maximum cost you are willing to pay for billing purposes.

Sample Electronic Mail Request

(Your Institutions Name)/NAL	JUL25NAL1	Date Not Needed After:
9/25/00		
(Your Department or Office Your University Library or Institution City, State or Province, Country, Mail Code)		
Dr. Smith (patron name) Biology Dept. (patron office)		
Canadian Journal of Soil Science 1988 v 68(1): 17-27 (complete citation)		
De Jong, R. Comparison of two soil-water models under semi-arid growing conditions		
NAL Call Number: 56.8 C162	Ver: AGRICOLA	
Remarks: Not available at university or in region		
Authorized by: Charles Johnson	CCL	Maxcost: \$15.00

Contact the Access Services Librarian, Document Delivery Services Branch at (301) 504-6503 or via Internet at access@nal.usda.gov with questions or comments about this policy.

Services Available to USDA Employees

Copies or loans of NAL materials are provided free-of-charge in response to job-related requests. Requests for materials may be submitted onsite in person, electronically (via ARIEL™, email or facsimile) or by U.S. Postal Service. Employees eligible for service from a local library such as ARS field libraries or Forest Service libraries should make use of these resources before contacting the National Agricultural Library (NAL).

Copy Service

A single copy may be provided, in lieu of loan, from materials in the NAL collection. **All** requests must indicate compliance with copyright restrictions. Providing complete, accurate citations and the NAL call number for a document (if available) will speed the processing of requests.

Loan Service

The loan period for NAL materials is one month. Loans may be renewed for an additional month if no one else is waiting to use the material. Make renewal requests in writing or by calling (301) 504-5755 prior to the due date.

Booking Audiovisuals

Submit request at least 3-4 weeks before the intended show date when requesting specific audiovisual titles. Specify the particular format preferred if more than one format is given in the citation. To renew audiovisuals or inquire about booking audiovisual materials call (301) 504-5994.

Copies from Non-Circulating Materials

The following materials are non-circulating: Serials (except for USDA serials); rare, reference, and reserve books; microforms; and proceedings of conferences or symposia. Although these materials may not be borrowed if NAL only owns one copy, requests may be filled in the form of a microform or paper copy if your request indicates copyright compliance. Please indicate on your original request form if a copy of the material is acceptable in place of a loan.

Delivery Options

Electronic delivery is the preferred method of document delivery at NAL. Copies of journal articles and duplicated microform materials are delivered by facsimile, ARIEL™, or U.S. Postal Service. Copies of material will be delivered electronically whenever a fax number or ARIEL™ IP address appears on the request. Books borrowed from other sources will be delivered by FedEx to ensure their safety and receipt.

Interlibrary Borrowing or Purchase

If materials are not available at the NAL, we will try to obtain from another source. Turnaround time on interlibrary loans varies depending on location and availability of materials. If an item cannot be obtained through borrowing, NAL will attempt to purchase it, which also adds to the turnaround time.

How to Format Requests

All requests, regardless of format, **must** include the data elements listed below. A separate request form must be submitted for each document. When requesting via e-mail, however, more than one request form may be included in the same e-mail message.

Required Data Elements

- Borrower's name, full mailing address, and USDA or other eligible agency name. On e-mail requests this information must be in block format with at least two blank lines above and below so form may be used in a window envelope.
- Complete citation including verification (source of citation) and NAL call number if available.
- Date after which item is no longer needed.
- Copyright Compliance
Pre-printed forms must contain your signature to indicate copyright compliance. On e-mail requests include the complete Statement of Copyright Compliance ("I have read the warning on copyright restrictions and accept full responsibility for compliance"), **your full name, date, and telephone number in each request**. Libraries may indicate compliance by including the initials of one statement, either "CCL" for compliance with the copyright law or "CCG" for compliance with Copyright Guidelines. Requests will be rejected if this information is not included.
- Fax number or ARIEL™ IP address (if delivery by either of these methods is desired).

E-Mail Request Procedures

E-mail: lending@nal.usda.gov

Electronic mail requests may be sent via the Internet to the address above. Multiple requests may be included in a single message if they are complete unto themselves, contain all of the required data elements and closely resemble the samples below. Each request within a message must be formatted as an individual request complete with name, address, copyright compliance, and request ID number. Use the following standardized number format to identify the requests included in the e-mail message:

1st request sent to NAL on July 25 will be jul25NAL1
2nd request sent to NAL on July 25 will be jul25NAL2

Each request should cite this identification number on the request form. The number or range of numbers if more than one request is included in the same e-mail message (ex: jul25NAL1-4) should also appear in the subject line of the e-mail message.

ARIEL™ Request Procedures

**NAL IP Address:
ariel.nal.usda.gov**

ARIEL™ is a document delivery software package (available from Research Libraries Group) which allows documents to be scanned and sent over the Internet. Requests can be submitted via email, mail, etc., or created on one of the standard forms listed under "Mail" below, scanned and sent to NAL's IP address. If an ARIEL™ 'receive only' package is loaded on to your computer you can receive and print articles at your desktop. If an ARIEL™ address is included in a request, NAL will deliver up to 30 pages per article via ARIEL™. If the article length exceeds 30 pages or cannot be scanned reliably, NAL will deliver the material via Postal Service. For more information about this software (including equipment requirements) visit RLG's ARIEL™ WWW site (http://www.rlg.org/cgi-bin/print_hit_bold.pl/ariel.html).

Mail & Fax Requests

Requests may be sent to NAL via the U.S. Postal Service or facsimile. Requests should be submitted using one of the standard forms listed below.

- AD-245 (available from USDA procurement)
- CALS Printout - copy & complete the address & copyright information from the AD245 on to the back of the CALS printout.
- Individual Request Form (IRF)
- ALA or FILLS Interlibrary Loan Form

Mailing Address:

Fax Number: (301) 504-5675

National Agricultural Library
Document Delivery Services Branch, 6th Floor
10301 Baltimore Avenue
Beltsville, MD 20705-2351

Sample Electronic Mail Request

JUL25NAL1

Date Not Needed After: 8/25/2000

Richard Smith
ARS, USDA
Research Station
Heartland, IA 56789

Canadian Journal of Soil Science 1988 v 68(1): 17-27
De Jong, R. Comparison of two soil-water models under semi-arid growing conditions.

NAL Call Number: 56.8 C162

Ver: AGRICOLA

I have read the warning on copyright restrictions and accept full responsibility for compliance

Richard Smith 7/25/00 Phone# (301)555-1234
(your) Fax#: (301)555-5678 (your) ARIEL IP Address: 111.222.333.444.555

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